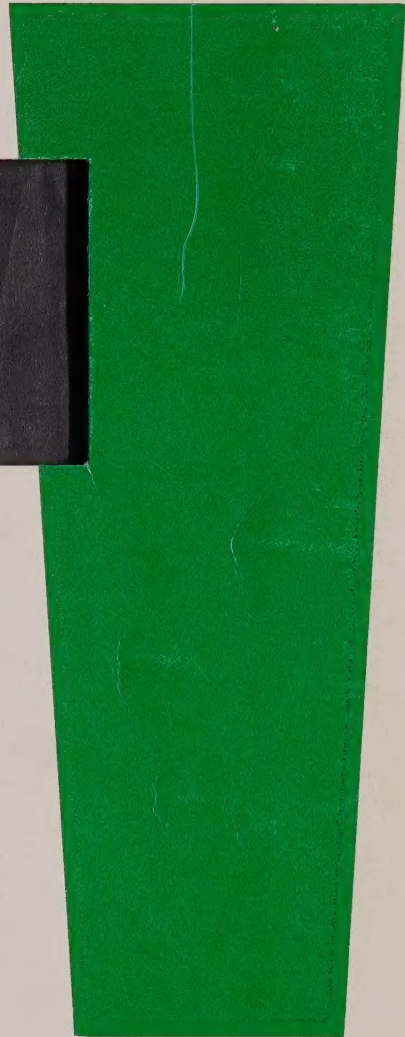


P.E. Chrens

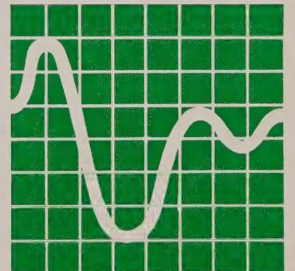
July 68

Room 122.



SORENSEN

A UNIT OF RAYTHEON COMPANY





INSTRUCTION MANUAL

MODELS 1001 and 2501 VOLTAGE REGULATORS

TABLE OF CONTENTS

	Page
I. General Information	(Inside Back Cover)
II. Specifications	4
III. Installation & Operation	7
IV. Principle of Operation	13
V. Maintenance & Repair	16

SORENSEN/A UNIT OF RAYTHEON CO., Richards Avenue, South Norwalk, Conn.

A14-1665F

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II. SPECIFICATIONS

The Models 1001 and 2501 are precision A. C. Voltage Regulators offering 0.01% regulation accuracy. These instruments are ideal for meter calibration or in standards laboratories. Both models are self-contained but can also be provided for relay rack mounting.

SPECIFICATION TABLE

MODEL	1001	2501
Input Power	95-130VAC Single Phase 55-65 cycles	
Output Voltage	16 Amps 110-120VAC, Adjustable	28 Amps
Regulation Accuracy	$\pm 0.01\%$ (See Specification Notes)	
Distortion	3% Maximum	
Load Range	0-1000VA	0-2500VA
Power Factor Range	Unity to 0.7 lagging	
Response Time	0.1 seconds	0.2 seconds
Ambient Temperature Range	0°C to 40°C (32°F to 104°F)	
Size	Width 19 1/8" Height 11" Depth 13 1/4"	Width 19 1/8" Height 12 3/4" Depth 15"
Weight	95 Lbs.	135 Lbs.

SPECIFICATION NOTES

Special Input Voltage Range

Auxiliary transformers are available which allow these instruments to be operated over higher input voltage ranges. Transformers can be supplied for either 190-260 VAC range (nominal 230VAC) or 380-520VAC (460VAC nominal). The replacement parts list shown in the rear of this manual gives complete descriptions of these transformers.

Regulation Accuracy

The regulation accuracy is $\pm 0.01\%$ for line and load variations combined, at the nominal input frequency with a resistive load. Normally, the output will deviate (within specifications) both plus and minus, at the preset voltage. Sometimes however, the deviation will be all plus or all minus.

Frequency and power factor affect the regulation accuracy, as well as the temperature ambient. The above specification for regulation accuracy is only guaranteed at a constant ambient temperature, nominal frequency, unity power factor and only at terminals X1 and X2 on the Model 1001 and "Output" and "Com" on the Model 2501.

Harmonic Distortion

The harmonic distortion is specified as being 3% maximum for both models. This figure applies to a linear resistive load with a sinusoidal input of 60 cycles. Frequency variations will increase the distortion figure. Other operating conditions such as input line distortion will increase the distortion.

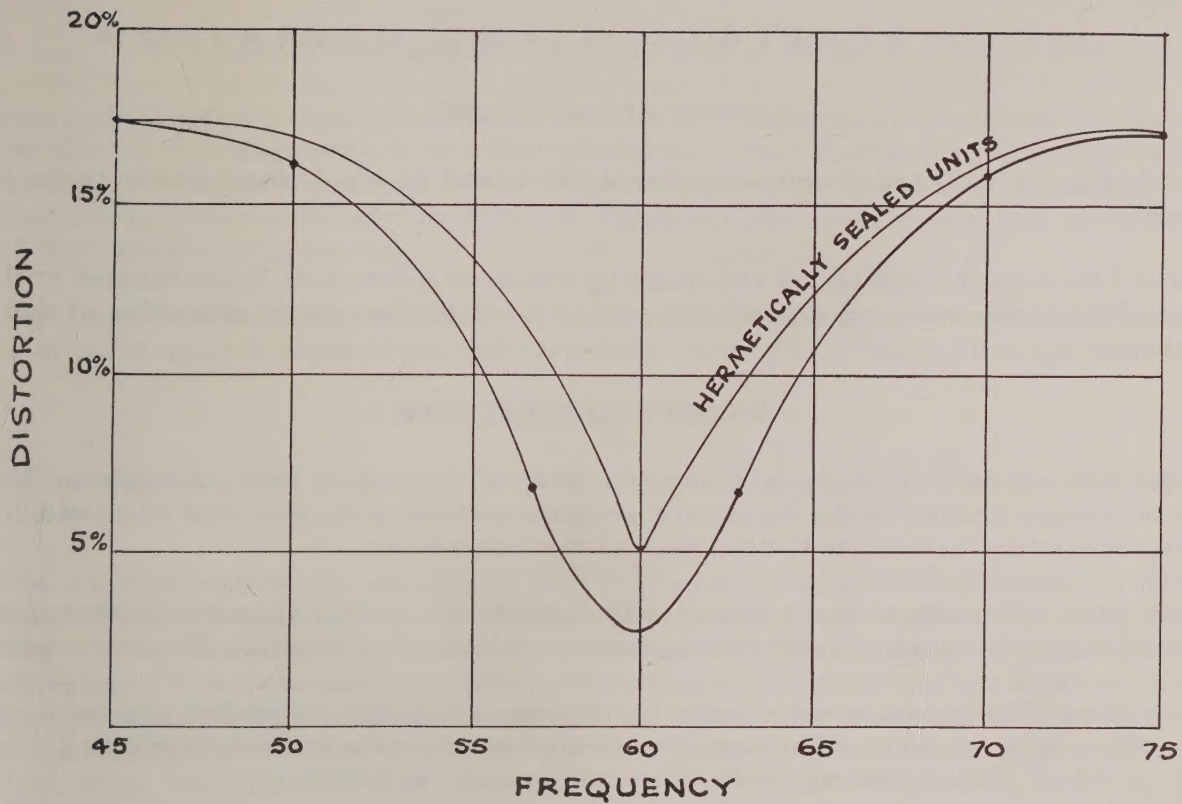
Note: See Graph A

Response Time

When an abrupt change occurs in the input voltage or load, an instantaneous change in the output voltage occurs. This instantaneous change is quickly suppressed by the regulation action of the instrument. Recovery time or response time is a measure of how fast this change is suppressed. It is defined as the time for the output voltage to effect a 63% recovery from the maximum deviated value, based upon a 10% line voltage change, or a 50% step change in the load.

RF Noise

These regulators are designed without any form of RF noise generating components, such as vibrators, gaseous devices, etc., hence noise is confined to higher harmonics of 60 cycles, and will be negligible above 10KC.



TYPICAL OUTPUT DISTORTION
vs.

Frequency Changes
Centered at 60 Cycles

GRAPH A

III. INSTALLATION AND OPERATION

INPUT CONNECTIONS

Model 1001 - A standard three prong line cord is used to supply input power to the instrument.

Model 2501 - Input connections are made by means of a terminal board located at the rear of the instrument. A ground terminal is available for safety grounding of the chassis.

OUTPUT CONNECTIONS

Model 1001 - A dual three prong receptacle is used for normal load connection. Also two terminals located on the Linkboard are provided for precision load regulation. Both connections are located at the rear of the instrument.

Model 2501 - The output load connections are made at a terminal board located at the rear of the instrument. These terminals are available by removing the rear cover.

Note: The ground terminal should be connected to the power line ground for safety reasons. The user should also incorporate an "external line switch" (safety switch) in the input line to this regulator.

GROUNDING

* *NOT TRUE*
The chassis is isolated from the input and output terminals and it is recommended that the chassis and case be grounded. The input is not isolated from the output as is evident, by referring to the schematic drawing.

POWER CONNECTION PRECAUTIONS

For safety reasons it is recommended that all Regulators be connected to the power line supply observing the following precautions.

Connect the Input Terminal which is marked "Common" to the grounded side of the 115 volt power line. (Where a line cord is supplied or where neither terminal is marked, the "Common" terminal can be established by selecting the input lead that connects directly to the output terminals, referring to the schematic diagram will be helpful. The grounded side of the power line is generally coded by white wiring and by bright plated connectors. All loads and load wiring should be connected so that the side which is intended to be the ground side of the line is connected to the output terminal marked "Common". Hence, the white wire feeding the load circuits should be connected to this "Common" terminal of the Regulator output.

These precautions guarantee that the ground side of the line is carried through the Regulator and out to the various loads.

AUXILIARY TRANSFORMERS FOR USE WITH THE REGULATOR

Sorensen & Company, Inc., can supply step-down transformers to permit the operation of a 115 Volt Regulator from a 230 volt power line. The windings of these transformers are isolated from each other; therefore, it will be necessary to add a ground connection in order to satisfy the National Electric Code requirement that one side of a 115 Volt system be grounded.

In such installation all that is necessary is to provide a connection from the "Common" side of the Regulator input and output terminals to the power supply line ground.

PROTECTIVE DEVICES

The fuse located on the front panel is provided only as a protection for the control components in the event of an internal failure.

All Regulators contain an overcurrent device (thermal snap-action disconnect switch) which prevents damage from overloading. This device permits overloads for a few seconds deviation of several times normal rating, but it disconnects the load from the Regulator if the overload persists. Smaller overload currents can exist for much longer periods before the thermal protector operates. The overcurrent device resets itself automatically after it has cooled off for a few minutes. This device is mounted on (or under) the chassis and is not available for manual operations.

The Model 2501 contains an overvoltage relay which also serves as the On-Off manual switch (on the front panel). This switch is principally used for turning the regulator on and off. Also, this switch is magnetically operated to turn off the regulator automatically in case of a circuit failure which causes the output voltage to rise above 130 volts. In case of such automatic trip the user should reset this switch to the On position. If the device again trips there is something defective in the Regulator. The voltage at which this relay trips out (130 to 135 volts) may be adjusted by the 50 watt adjustable resistor in series with the relay coil (see schematic). This adjustment can be accomplished only if an accurate voltmeter and a variac voltage source are available. (Normally the factory adjustment need not be changed unless replacing these parts). Disconnect the relay coil and its series resistor from the regulator. Apply 115 volts from the variac source to the resistor-coil series combination and adjust the resistor until the relay trips from On (set manually) to off just as the voltage reaches 130. The over voltage switch is designed to function correctly when mounted in its normal operating position.

Should this switch trip off, then the pilot lamp on the front panel will go out indicating trouble.

Caution: On the Model 2501 Do Not Touch the regulator circuitry or load wiring until the input power is disconnected by an external switch (or the input line cord removed from the power outlet).

The On-Off switch is a single pole device which disconnects only one side of the Regulator from the input line. One side of the line is still connected to the load in the OFF position. Therefore, before working on the regulator, the input line should be opened by means of the "external line switch" provided by the user.

OPERATING INSTRUCTIONS

Main controls are located on the front panel and consist of the following:

Power Switch

On the Model 1001, this switch opens both sides of the line when in the OFF position. On the Model 2501, this switch opens only one side of the input line when in the OFF position. This switch also provides automatic overvoltage protection. (Refer to "Protective Devices", above).

Fuse

Protects the control circuit only. If this fuse opens there will still be a voltage appearing at the output if the power switch is in the ON position. (Note: on the Model 2501 two fuses are used to protect the control circuit).

Pilot Light

Indicates voltage at the output terminals.

Output Voltage Adjustment Control

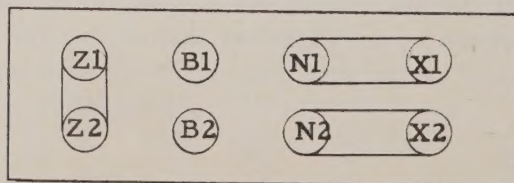
This potentiometer is normally arranged to adjust the output over range of 115 ± 5 volts when the selector switch is in the REG position.

Three Position Selector Switch & Sensing Links

This switch operates in conjunction with the link terminal board (on the rear of the chassis in the 1001, behind the front panel on the 2501) to provide optimum operation under various conditions. The switch positions are marked on the panel EXT, STAB and REG. For general use, the REG position is recommended. See discussion below for each position and for the link terminal positions required.

1. "REG" Position

When the switch is in this position, the output voltage can be adjusted by means of the potentiometer on the front panel. (Regulator or normal position). Connect the links on the link terminal board as follows:



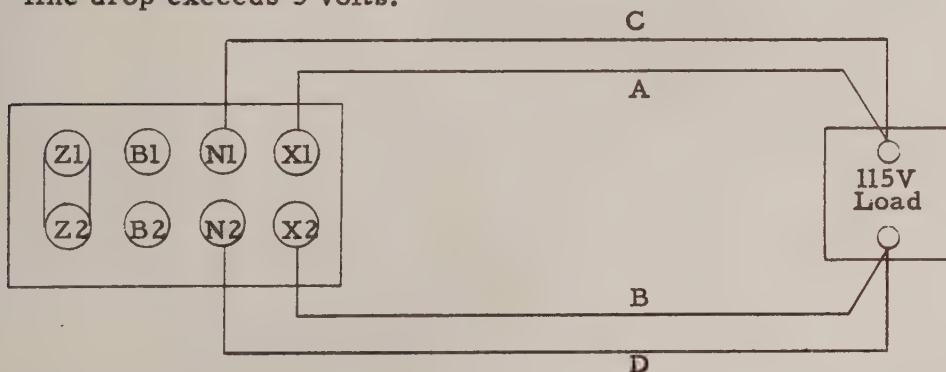
Normal Link Position

LOWER
RIGHT
HALL

CONNECTED
JULY 5, 68
REG

Note: (Model 1001 only). While the load may be connected by plugging into the dual receptacle at the rear of the chassis, it is often desirable to eliminate plug contact resistance by connecting the load directly to terminals X1 and X2 of the link board. On the Model 2501, the load must always be connected to the main power terminal board, not to the link board.

It is also possible to eliminate the effects of voltage drop in the line carrying the current to the load so as to hold rated accuracy at a remote load. This can be done by remote sensing but should not be done if the line drop exceeds 5 volts.



A and B are the power leads, C and D the sensing leads.

Note: For the Model 2501, connect load leads A and B to the main power terminal board, not to X1 and X2 (X1 and X2 are unconnected).

If an isolation transformer is used between the Regulator and the load, then sensing leads C and D can be connected to the transformer secondary (load side) to eliminate the transformer regulation; however, capacitors may be needed per the note in the section below ("EXT position").

2. "STAB" Position

For critical applications requiring long-time stability, this position may be used. With the switch in this position the panel potentiometer is replaced by a wire wound adjustable resistor (R23) located on the rear of the chassis. (On the Model 2501 this control is located behind the front panel). This permits adjusting of the output and then locking the adjustment, thereby eliminating the contact resistance of the potentiometer. (Stabilized position).

Connect the links and load as per "REG Position", above. Remote sensing may be employed as noted above also.

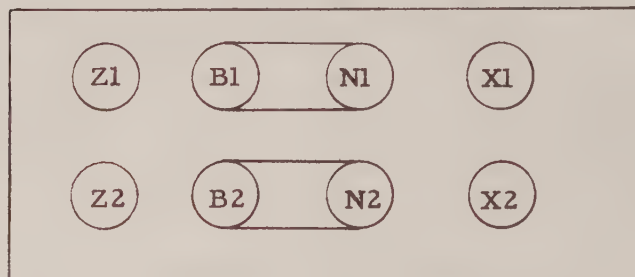
CAUTION NOTE:

AT THIS POINT IT SHOULD BE NOTED THAT WHEN THE SELECTOR SWITCH IS IN THE STAB OR REG POSITION THE LINK BETWEEN Z1 AND Z2 SHOULD BE IN PLACE AS SHOWN. IF THE SELECTOR SWITCH IS ACCIDENTALLY SWITCHED TO EXT WITH OUT THIS LINK IN PLACE, THE OUTPUT WILL RISE AND THE 2AS15 WILL BE PERMANENTLY DAMAGED.

3. "EXT" Position

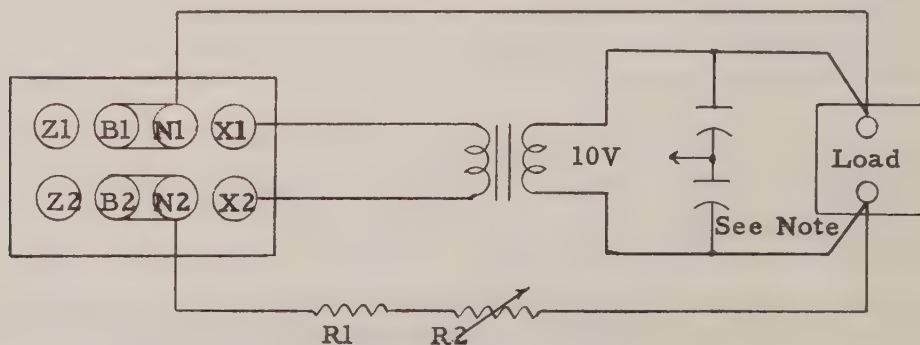
With the switch in this position and the links on the terminal board rearranged, it is possible to regulate an output other than the nominal 110-120 volts.

Connect the links on the rear terminal board as follows:



With these connections the control or sensing leads (which are the diode filament leads) are available at terminals B1 and B2 on the link board. It is necessary to add external resistance in series with the sensing leads equal to 3.5 ohms per volt. This added resistance lowers the voltage applied to the filament to approximately 1.8 volts. Note that about 30% of this added resistance should be adjustable in order to obtain output adjustment. The sensing circuit draws about 300MA through this resistance.

Model 1001 - A typical application is illustrated below where it is desired to regulate 10 volts precisely, utilizing a 115 to 10V step-down transformer. The transformer used should not have no-load to full load regulation in excess of 5%.

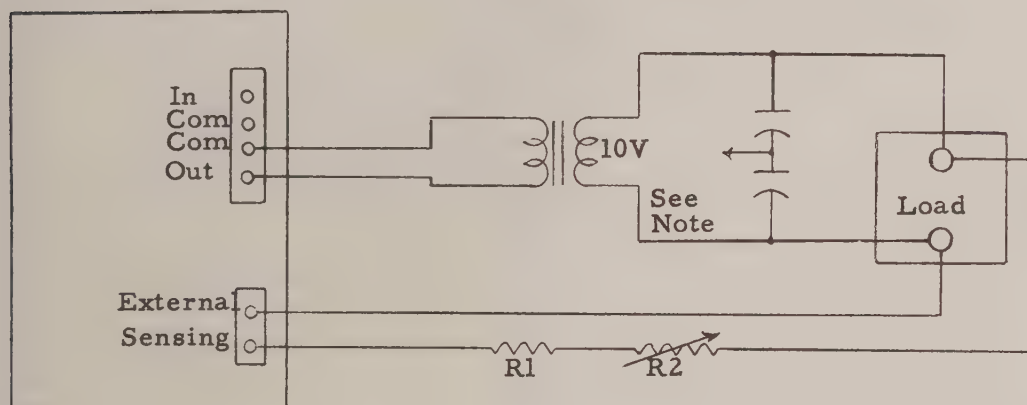


In order to drop the 10V sensing signal down to 1.8 across terminals N1 and N2, the total resistance (R1 + R2) should equal -

$$\frac{10 - 1.8V}{0.3A} = \frac{8.2V}{0.3A} = 27.4 \text{ ohms}$$

To allow adequate adjustment range, this should be increased to about 35 ohms. R1 of 25 ohms with R2 of 10 ohms adjustment should be about right. Note that by using the 3.5 ohms per volt value that $10 \times 3.5 = 35$ ohms, giving the same value.

Model 2501 - The above information holds true for this unit except for the following. The transformer primary leads are connected to the main terminal board rather than to X1 and X2 terminals. The sensing loads are wired to the external sensing board, (located at the rear of the unit), rather than to N1 and N2 terminals.



Note: All units prior to serial number 1B-756 for the 1001, and serial number 2A-123 for the 2501 require external capacitance. The later serial numbered units have these capacitors wired across N1 and N2.

The reason for the capacitors across the 10V winding is as follows. Whenever an isolation transformer is used between the Regulator output and the diode referencing, it is necessary to provide a low-impedance AC path from the transformer secondary returning to pin 8 of V3 for stability of the Regulator output. For example, when using a step-down isolation transformer, then connect two 1 mfd. capacitors in series across the low voltage secondary with the center tap junction of these capacitors returned to pin 8 of V3. Other voltages may require somewhat different capacitors, to be determined experimentally.

CAUTION: DO NOT TURN ON THE REGULATOR UNTIL THE SENSING CIRCUIT IS PROPERLY CONNECTED. OTHERWISE, OVERVOLTAGE DAMAGE TO THE REGULATOR AND LOAD WILL RESULT.

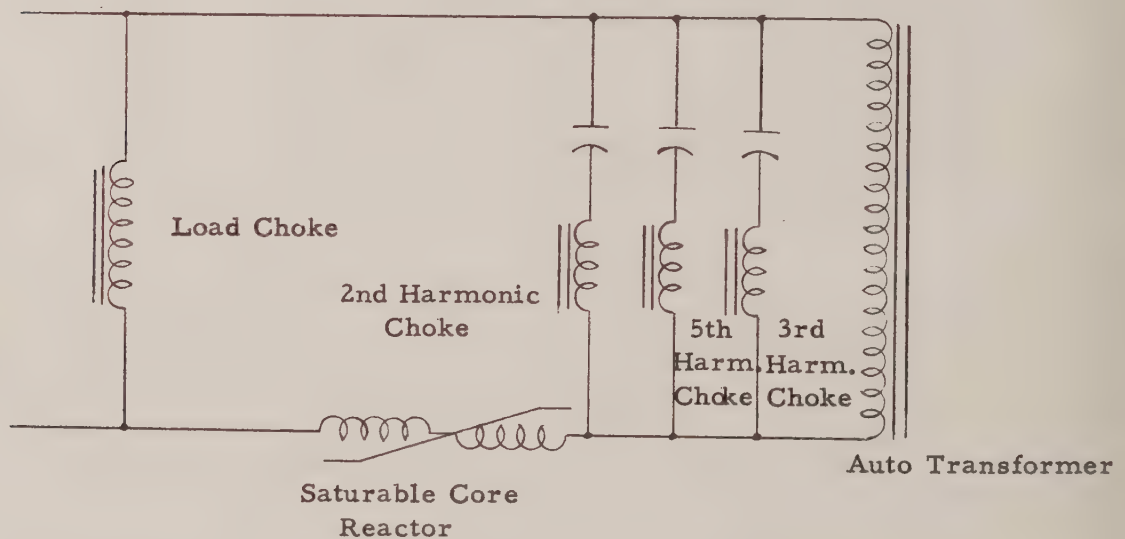
IV. PRINCIPLE OF OPERATION

The operation of these instruments can best be understood by referring to the schematic diagram included in the maintenance portion of this manual.

These instruments can be divided into two basic circuits, a power and a control circuit.

The basic power circuit is shown below. This circuit includes an auto transformer and a saturable core reactor, together with a second, third and fifth harmonic filter and a loading choke.

POWER CIRCUIT



The reactor is in series with the primary of the auto transformer across the input terminals. Variation of the impedance of the Saturable Core Reactor will vary the voltage impressed on the primary of the auto transformer and consequently will vary the output voltage.

A decrease in reactor impedance, for instance, will increase the portion of the input voltage impressed on the auto transformer primary and will result in an increase in output voltage.

Conversely, an increase in reactor impedance will result in a decrease in output voltage.

The phase relationships that exist in the power circuit are shown by the following Vector diagram for both high and low input voltages.



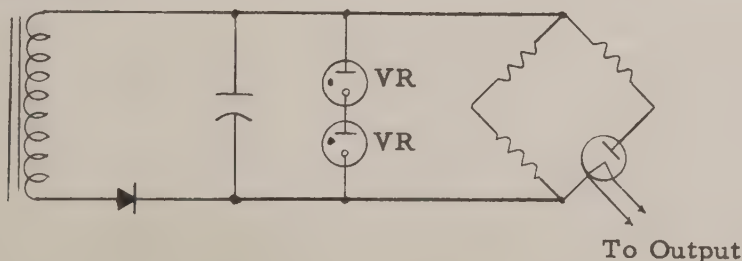
- ESCR - Voltage across the Saturable Core Reactor
- Ein - Input Voltage
- Eout - Output Voltage
- EP - Voltage across the primary of the Auto Transformer
- ES - Voltage across the secondary of the Auto Transformer

When the input voltage is increased, it will be necessary to increase the impedance of the saturable core reactor to prevent the output voltage from increasing.

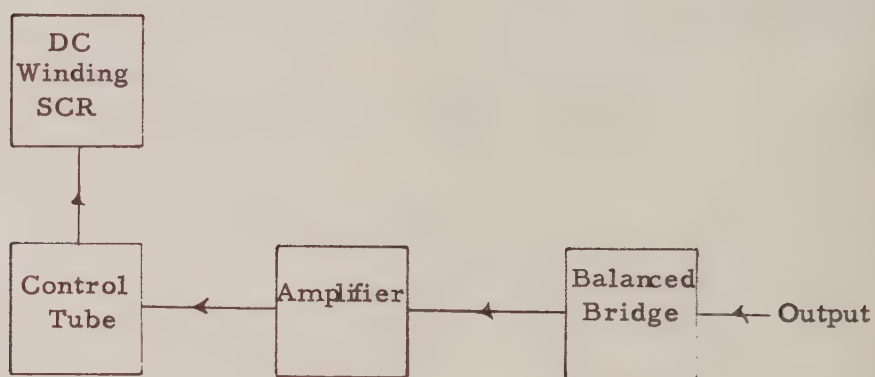
CONTROL CIRCUIT

The heart of the control circuit is the voltage sensing, temperature limited diode (2AS15A). This diode forms part of a balanced bridge. A regulated power supply consisting of two (2) VR (OB2) Regulator Tubes (or on older models 4 neon lamps) provide stable B+ voltage for this bridge. The diode filament is fed from the output of the regulator.

Power Transformer



Any small increment of output voltage change is impressed on this diode, thus unbalancing the bridge. This unbalance voltage (error signal) is amplified through two stages (6SL7GT) and applied to the grid of the output control tube (6L6). The control tube then supplies the necessary current to the DC winding of the Saturable Core Reactor to maintain a constant output voltage level.



STARTING CIRCUITRY

Special provisions are made in both models to improve the ability of the Regulator to start under heavy load (such as P. F. loads) with low line voltage.

On the Model 1001, the transformer T5 (connected across the secondary windings of auto transformer T4) provides a booster action to increase the filament voltages of V3 and V4 during the warmup period. Note that without this "boost" these filaments would be operating on very low voltage during this warmup period.

On the Model 2501, the filaments of all tubes are operated from the unregulated input line during this warmup period in order to obtain adequate voltage. After time delay of about 60 seconds (obtained from the time delay relay K2 "RLY2*") the filaments, etc., on T1 are transferred to the regulated output voltage by means of the transfer relay K1 (RLY1*).

* Symbols used in earlier models

V. MAINTENANCE AND REPAIR

MAINTENANCE

During normal life these regulators require no maintenance other than the care usually afforded similar equipment. It is suggested that excessive dust, etc., be removed periodically exercising care to prevent damage by cleaning tools or excessively strong air blasts. Vacuum tubes should be replaced at the end of their specified life in accordance with the policies established for the particular application.

SPARE PARTS

All components used in these regulators are of a good commercial grade and can be expected to give a reasonably long period of trouble free service. As the age of the regulator increases, some components are likely to deteriorate. We suggest that you note those items asterisked on the Replacement Parts List, which we recommend be kept on hand.

In the event it becomes necessary to replace any part, we strongly suggest that the replacement parts be of the same value as the original. Substitute parts should not be used unless we assure you that the substitute part will not impair the performance of the regulator.

REPAIR

CAUTION: DANGEROUS VOLTAGES EXIST IN THESE REGULATORS. PLEASE OBSERVE APPROPRIATE PRECAUTIONS.

Typical circuit voltages are indicated on the schematic diagram supplied with this manual. All voltage measurements should be taken with a 1000 ohms/volt meter, except grid voltages which should be measured with VTVM.

In the event of a malfunctioning of the instrument, a systematic checking procedure will provide the quickest and surest method of locating the difficulty. The Trouble Shooting Chart gives the procedures to be followed in locating sources of trouble.

TROUBLE SHOOTING CHART

Symptom	Cause	Checking Procedure
All Troubles	Open Fuse or Defective Tube	The first step in trouble shooting should be to check the fuses, then replace each tube with one known to be good. In many cases this will correct the difficulty.
No Output Voltage	Open Power Circuit	Test for an open circuit in one of the following components, on-off switch, circuit breakers, AC windings of saturable core reactor, and auto transformer.
No Regulation and Low Output Voltage with Load	Failure of the Control Circuit to supply proper saturating current	Check its DC power supplies. No voltage will indicate a failure of the transformer windings, filter condensers or selenium rectifiers. Note: These supplies will not deliver rated voltage until the Regulator output voltage is 115 volts so that no exact voltage checks can be made. Check plate voltage and grid voltage of V3. If the grid voltage is abnormally negative and causing cut off, check the bridge supply voltages E1 and E2 and the diode filament supply voltage and E3 supply voltage. Check the DC reactor windings for an open.
No Regulation and High Output Voltage	Failure in the Control Circuit	Check V3 grid voltage to cathode. If this voltage is abnormally positive or zero, check contacts, connections and resistance values of all components of the V2 bridge and V1. (Note that the second half of V1 can be checked simply by replacing V3 and then removing V1. If output voltage drops then second half of V1 is working properly). Check the bridge rectifier. Check the DC power supplies. No voltage will indicate a failure of the transformer windings filter condenser or selenium rectifiers. (Check Rectifier Tube). Check the voltage adjustment potentiometer for dirty contacts. Use the "Stab" position of the panel switch to eliminate this potentiometer.

TROUBLE SHOOTING CHART

Symptom	Cause	Checking Procedure
Output Voltage Drift	Variation of Tube characteristics due to age	Check tubes or replace with spares known to be good
Poor Regulation	Component failure in Control Circuit	Check VR tubes (V5 and V6) *(P1-P4 neon lamps). These lamps are in series and if one fails all will become dark. Check the DC power supply voltages (E1, E2 E3 and E4). These voltages are noted on the schematic diagram. Check the control circuit in general for loose connections, shorts or damaged parts. Check voltage and resistance values. Check Condensers by replacement. The output voltage adjust potentiometer may cause irregular output adjustment. Turn the potentiometer shaft several times in both directions as far as it will go. This is a very low resistance adjustment and contacts can oxidize enough to cause uneven control.

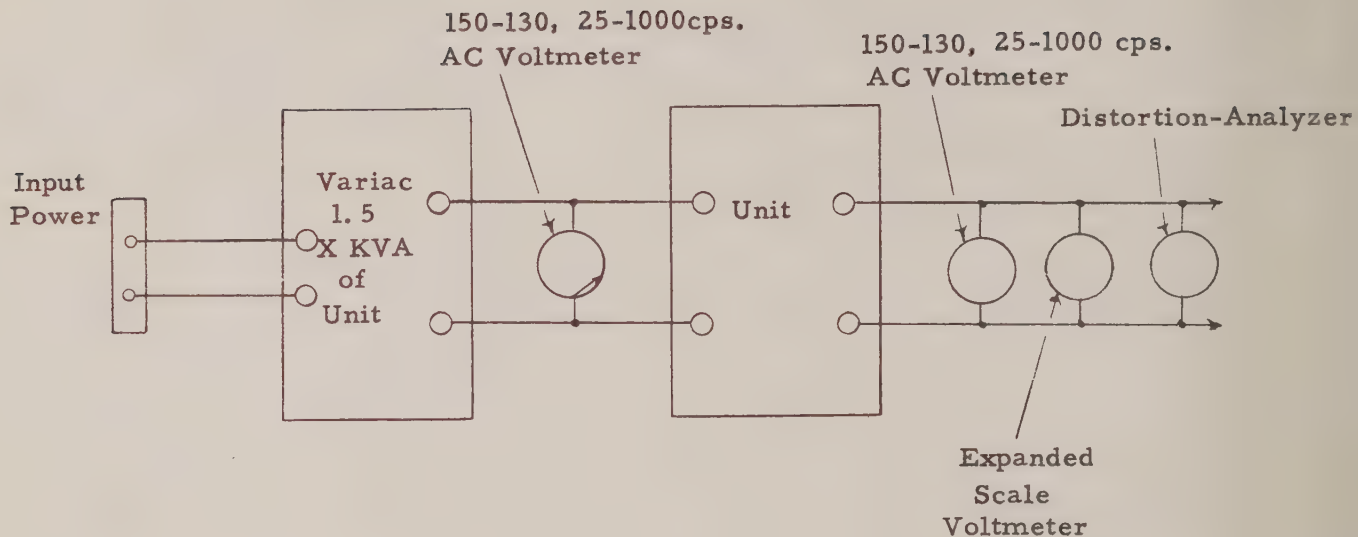
* Used on earlier models.

In the event of serious trouble or damage to the regulator you should consider returning it to the factory or our service representative for repair.

CHECKING REGULATION ACCURACY

Because of the precise regulation accuracy of these models (0.01%) it is impossible to check voltage deviations with a standard A. C. Voltmeter. Shown below is a list of the equipment necessary to accurately check these models. It should be noted that to accurately check the instruments for all phases of operation requires detailed test instructions. Should the user desire to make such a test it is suggested that our nearest service representative (a list appears at the rear of the manual) or the factory be contacted for complete information.

TEST SET-UP



Variac - To control input voltage to the regulator. This variac must have a rating 1.5 times the KVA rating of the unit being tested.

2 - A. C. Voltmeters - 150-130VAC, 25-1000 cps. (Weston Type 433)

1 - Expanded Scale Voltmeter - To enable the tester to accurately read the output voltage deviations. Complete information on the Sorensen Expanded Scale Voltmeter may be obtained by writing to the factory and referencing Service Bulletin #154.

1 - Distortion Analyzer - To accurately read output voltage distortion (Hewlett Packard Model 330B).

Replacement Parts List

Model 1001

Starting with Serial Number 1B-897

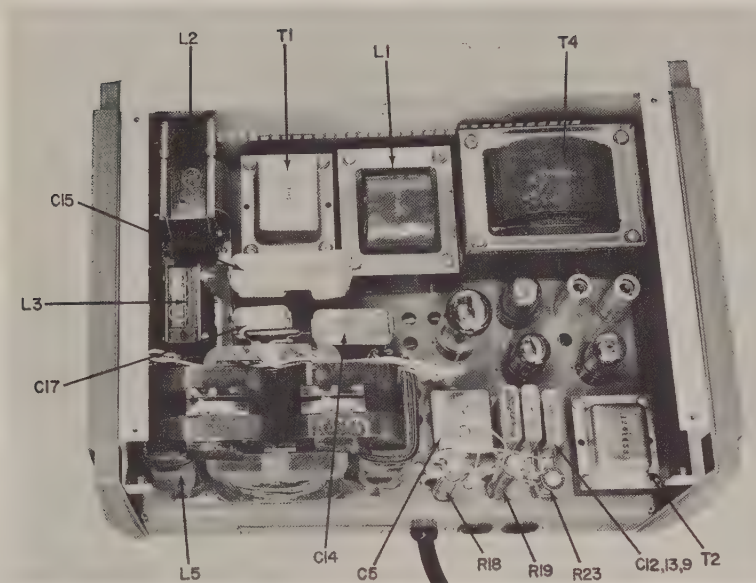
Listed below are all the components used in this instrument, together with their functions and part numbers.

Reference to the schematic diagram furnished with this manual will give the position of each component in the circuitry.

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
R1	100K ohm 1/2W Resistor	60 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R2	100K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R3	5100 ohm 1/2W Resistor	60 Cycle Filter Resistor	27-135	Allen Bradley EB5125
R4	10K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-137	Allen Bradley EB1035
R5	470K ohm 1/2W Resistor	Bridge Resistor	27-136	Allen Bradley EB4745
R6	470K ohm 1W Resistor	Bridge Resistor	27-245	Allen Bradley GB4741
R7	1 meg ohm 1/2W Resistor	Bridge Resistor	27-124	Allen Bradley EB1051
R8	68K ohm 1W Resistor	Anti-Surge	27-227	Allen Bradley GB6831
R9	3K ohms 5W Resistor	Filter Resistor	27-431	Ward Leonard 5X
R10	5K ohms 5W Resistor	Filter Resistor	27-430	Ward Leonard 5X
R11	47K ohm 1W Resistor	Anti-Surge	27-223	Allen Bradley GB4731
R12	470K ohm 1W Resistor	Dropping Resistor	27-245	Allen Bradley GB4741
R13	100K ohm 1/2W Resistor	Dropping Resistor	27-116	Allen Bradley EB1045
R14	47K ohm 1/2W Resistor	Anti-Hunt Resistor	27-111	Allen Bradley EB4735
R15	500K ohm 1W Resistor	Bridge Resistor	27-928	Mepco WM4L 1%
R16	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R17	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R18	180 ohm 50W Adj. Resistor	Dropping Resistor	27-868	Tru-ohm AR50
R19	180 ohm 50W Resistor	Dropping Resistor	27-869	Tru-ohm FR50
R20	25K ohm 10W Resistor	A. C. Shunt Resistor	27-566	Sprague Type 28-E
R21	35K ohm 20W tap at 10K ohms	Bleeder Resistor	90-071	Sorensen
R23	75 ohm 25W Adj. Resistor	Stabilized Output Adjust	27-735	Tru-ohm AR25
R24	50 ohm 7W Potentiometer	Output Adjust Potentiometer	29-223	Mallory per Sorensen Spec.
C1	0.1 mfd. 200VDC Capacitor	60 Cycle Filter	24-101	Sprague 67P10492
C2	0.27 mfd. 200VDC Capacitor	60 Cycle Filter	24-108	Sprague 67P27492
C3	0.047 mfd. 200VDC Capacitor	120 Cycle Filter	24-100	Sprague 67P47392
C4	0.047 mfd. 200VDC Capacitor	120 Cycle Filter	24-100	Sprague 67P47392
C5	1.0 mfd. 600VDC Capacitor	Anti-Hunt Capacitor	24-305	Cornell Dubilier YAB 6100
C6	2.0 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-227	Sprague PBTT-565

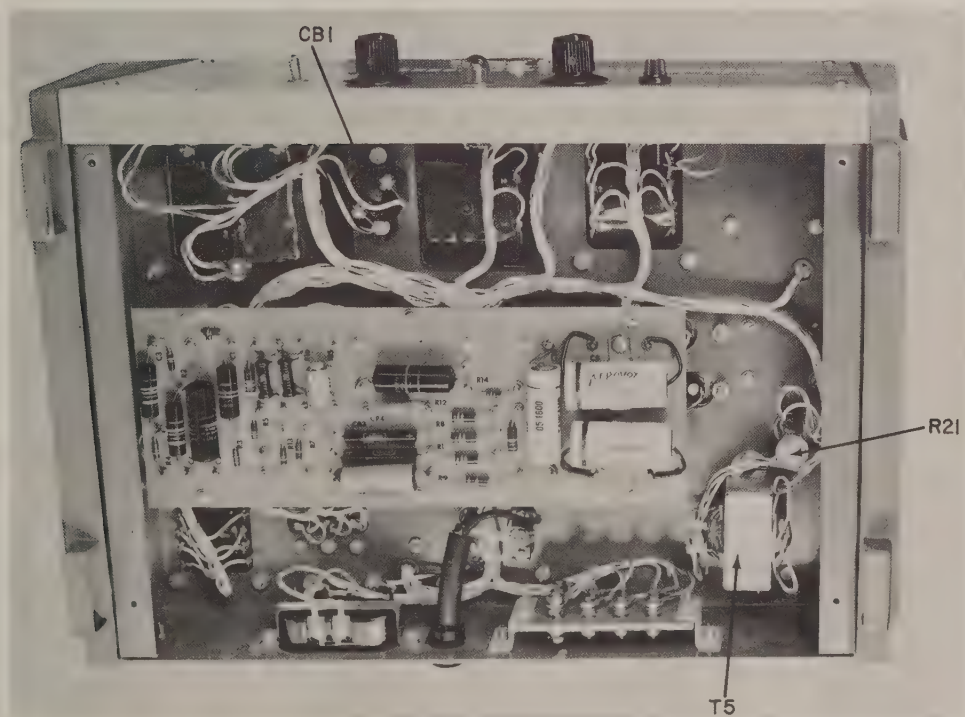
Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
C7	0.3 mfd. 600VDC Capacitor	Anti-Hunt Capacitor	24-184	Aerovox 84CM
C8	0.3 mfd. 600VDC Capacitor	Anti-Hunt Capacitor	24-184	Aerovox 84CM
C11	0.1 mfd. 600VDC Capacitor	Filter Capacitor	24-125	Sprague 73P10406
C12	1.0 mfd. 600VDC Capacitor	Filter Capacitor	24-305	Cornell Dubilier YAB 6100
C13	0.5 mfd. 600VDC Capacitor	Filter Capacitor	24-304	Cornell Dubilier YAB 605
C14	4.0 mfd. 600VDC Capacitor	Filter	24-383	Aerovox 609M
C15	10.0 mfd. 330VAC Capacitor	3rd Harmonic Filter	24-303	Cornell Dubilier KGT 3100
C17	3.0 mfd. 330VAC Capacitor	5th Harmonic Filter	24-300	Cornell Dubilier KGT3030
C18	0.5 mfd. 1600VDC Capacitor	Ripple Suppressor	24-180	Sangamo Type 39
* CR1	Selenium Rectifier	Power Supply Rectifier	26-947	Bradley SE7L36H438
* CR2	Selenium Rectifier	Power Supply Rectifier	26-987	I. R. C. Z25HP
* CR3	Selenium Rectifier	Power Supply Rectifier	26-947	Bradley SE7L36H438
* CR4	Selenium Rectifier	Anti-Surge Rectifier	26-904	Bradley SE8LA10H342
* T1	Power Transformer	Power Transformer	126-1075	Sorensen
T2	Control Power Transformer	Power Transformer	126-1653	Sorensen
L1	Load Reactor	Load Reactor	127-760	Sorensen
L2	Third Harmonic Choke	3rd Harmonic Choke	127-1322	Sorensen
L3	Fifth Harmonic Choke	5th Harmonic Choke	127-1393	Sorensen
L4	Second Harmonic Choke	2nd Harmonic Choke	127-1268	Sorensen
L5	Saturable Core Reactor	Saturable Core Reactor	127-1370	Sorensen
* V1	6SL7GT Tube	Amplifier	12-034	RCA
* V2	2AS15A Tube	RMS Detector	12-010	Thermosen, Inc.
* V3	6L6GB Tube	Power Output	12-032	RCA
* V4	5Y3GT Tube	Rectifier Tube	12-023	RCA
* V5-V6	OB2 Tube	To regulate sensing bridge B Supply	12-001	Comm'l. Type
	Type ST-15, 1.5KVA, 480/240 and 240/120, 60 Cycle	Isolation Step Down Transformer	91-911	Hindle 2275
* F1	1.5 Amp 3AG Fuse 250V	Protective Fuse	42-407	Littlefuse 312015

Top View



MODEL 1001

Starting with Serial No. 1B-897



Bottom View

Replacement Parts List

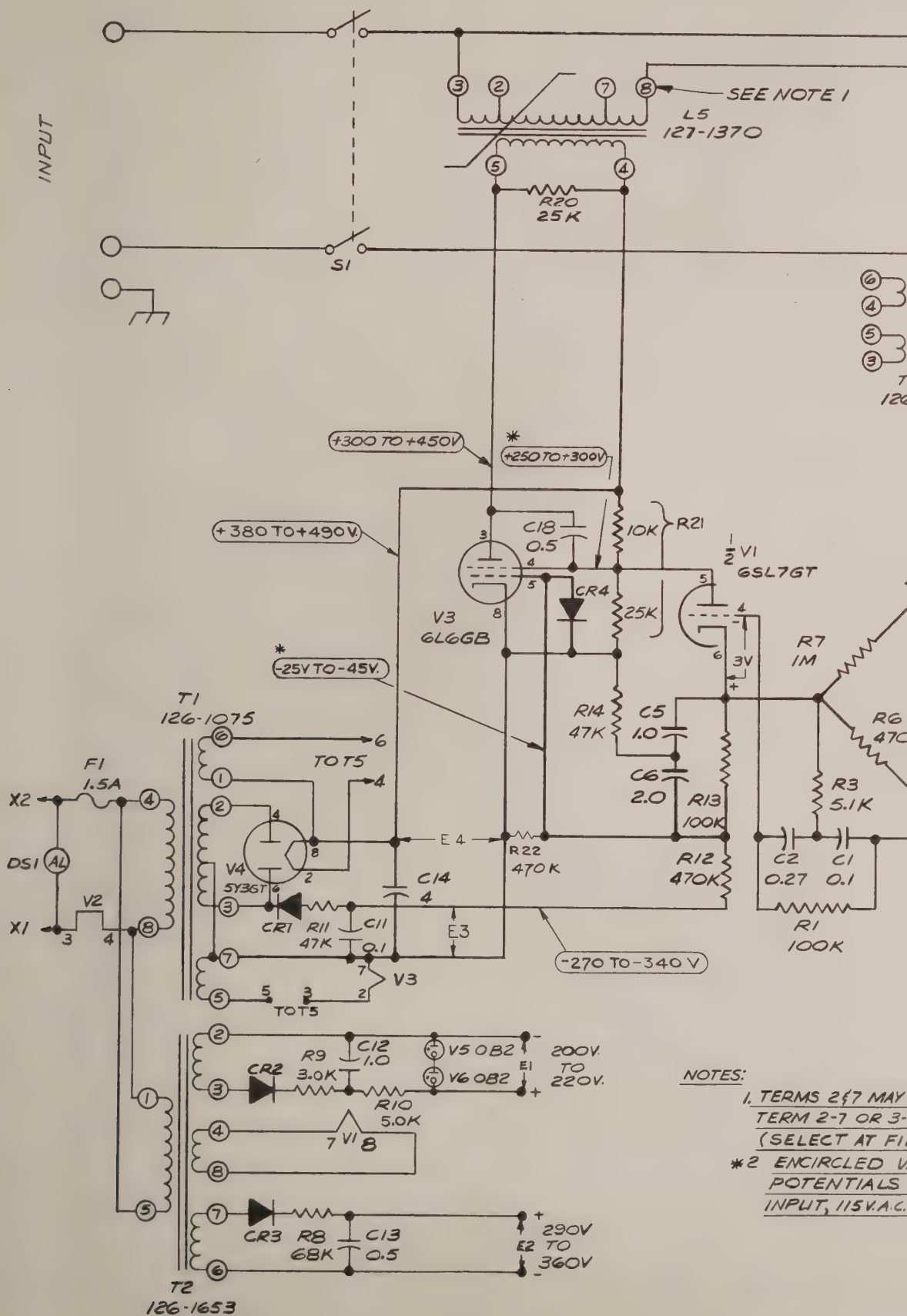
Model 1001

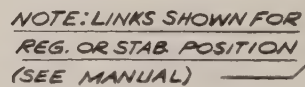
All Serial Numbers Before 1B-897

Listed below are all the components used in this instrument, together with their functions and part numbers.

Reference to the schematic diagram furnished with this manual will give the position of each component in the circuitry.

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
R1	100K ohm 1/2W Resistor	60 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R2	100K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R3	5100 ohm 1/2W Resistor	60 Cycle Filter Resistor	27-135	Allen Bradley EB5125
R4	10K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-137	Allen Bradley EB1035
R5	470K ohm 1/2W Resistor	Bridge Resistor	27-136	Allen Bradley EB4745
R6	470K ohm 1W Resistor	Bridge Resistor	27-245	Allen Bradley GB4741
R7	1 meg ohm 1/2W Resistor	Bridge Resistor	27-124	Allen Bradley EB1051
R8	68K ohm 1W Resistor	Anti-Surge	27-227	Allen Bradley GB6831
R9	25K ohm 1W	Filter Resistor	27-926	Mepco WM3L 1%
R10	50K ohm 1W Resistor	Filter Resistor	27-927	Mepco WM3L 1%
R11	47K ohm 1W Resistor	Anti-Surge	27-223	Allen Bradley GB4731
R12	470K ohm 1/2W Resistor	Dropping Resistor	27-245	Allen Bradley GB4741
R13	100K ohm 1/2W Resistor	Dropping Resistor	27-116	Allen Bradley EB1045
R14	47K ohm 1/2W Resistor	Anti-Hunt Resistor	27-111	Allen Bradley EB4735
R15	500K ohm 1W Resistor	Bridge Resistor	27-928	Mepco WM4L 1%
R16	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X
R17	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X
R18	180 ohm 50W Adj. Resistor	Dropping Resistor	27-868	Tru-ohm AR50
R19	180 ohm 50W Resistor	Dropping Resistor	27-869	Tru-ohm FR50
R20	25K ohm 10W Resistor	AC Shunt Resistor	27-529	Ward Leonard 10F
R21	35K ohm 20W tap at 10K ohms	Bleeder Resistor	90-071	Sorensen
R23	75 ohm 25W Adj. Resistor	Stabilized Output Adjust	27-735	Tru-ohm AR-25
R24	70 ohm 10W Potentiometer	Output Adjust Potentiometer	29-026	Hardwick Hindle 2462-F
C1	0.1 mfd. 200VDC Capacitor	60 Cycle Filter	24-101	Sprague 67P10492

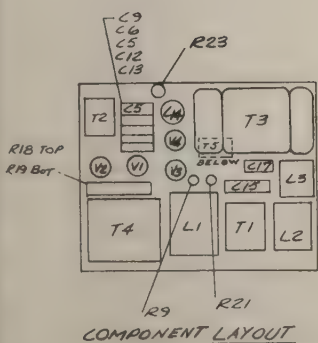
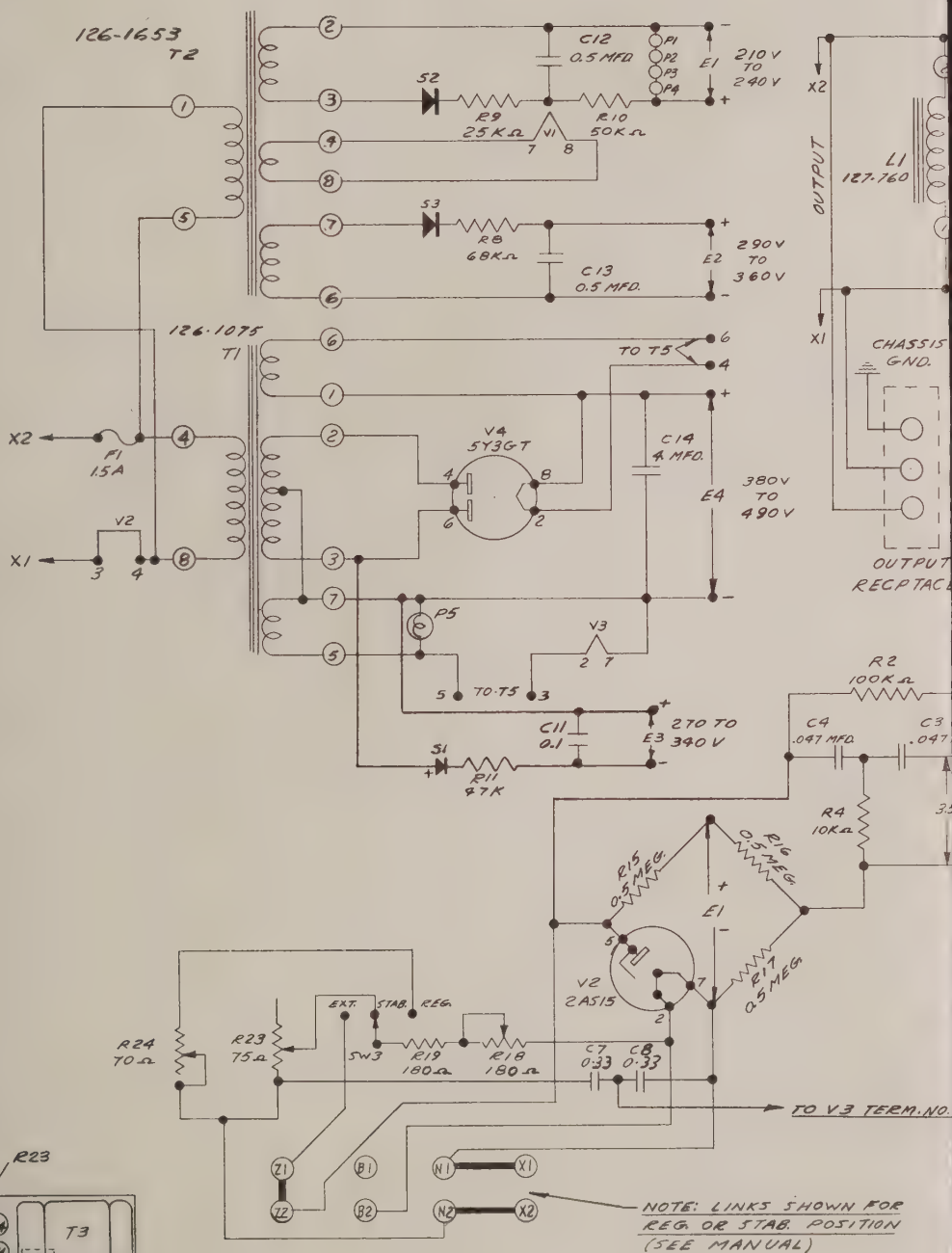




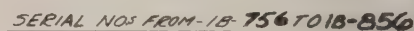
SERIAL NOS FROM 1B-897 TO

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
C2	0. 27 mfd. 200VDC Capacitor	60 Cycle Filter	24-108	Sprague 67P27492
C3	0. 047 mfd. 200VDC Capacitor	120 Cycle Filter	24-100	Sprague 67P47392
C4	0. 047 mfd. 200VDC Capacitor	120 Cycle Filter	24-100	Sprague 67P47392
C5	1. 0 mfd. 600VDC Capacitor	Anti-Hunt Capacitor	24-305	Cornell Dubilier YAB6100
C6	1. 0 mfd. 600VDC Capacitor	Anti-Hunt Capacitor	24-305	Sprague 67P47392
C7	0. 3 mfd. 600VDC Capacitor	Anti-Hunt Capacitor	24-184	Aerovox 84CM
C8	0. 3 mfd. 600VDC Capacitor	Anti-Hunt Capacitor	24-184	Aerovox 84CM
C11	0. 1 mfd. 600VDC Capacitor	Filter Capacitor	24-125	Sprague 73P10406
C12	0. 5 mfd. 600VDC Capacitor	Filter Capacitor	24-304	Cornell Dubilier YAB6050
C13	0. 5 mfd. 600VDC Capacitor	Filter Capacitor	24-304	Cornell Dubilier YAB6050
C14	4. 0 mfd. 600VDC Capacitor	Filter	24-430	Cornell Dubilier TNAD6040
C15	10. 0 mfd. 330VAC Capacitor	3rd Harmonic Filter	24-303	Cornell Dubilier KGT3100
C17	3. 0 mfd. 330VAC Capacitor	5th Harmonic Filter	24-300	Cornell Dubilier KGT3030
S1	Selenium Rectifier	Power Supply Rectifier	26-900	Bradley SE8L32H
S2	Selenium Rectifier	Power Supply Rectifier	26-900	Bradley SE8L32H
S3	Selenium Rectifier	Power Supply Rectifier	26-900	Bradley SE8L32H
S4	Selenium Rectifier	Anti-Surge Rectifier	26-900	Bradley SE8L32H
T1	Power Transformer	Power Transformer	126-1075	Sorensen
T2	Control Power Transformer	Power Transformer	126-1653	Sorensen
T3	Saturable Core Reactor	Saturable Core Reactor	127-964	Sorensen
T4	Auto Transformer	Auto Transformer	126-1074	Sorensen
T5	Booster Transformer	Filament Booster Transformer	126-1347	Sorensen
L1	Load Reactor	Load Choke	127-760	Sorensen
L2	Third Harmonic Choke	3rd Harmonic Choke	127-956	Sorensen
L3	Fifth Harmonic Choke	5th Harmonic Choke	127-955	Sorensen
* SW1	Power Switch D.P.S. T.	Power Switch	45-112	Cutler Hammer 7561 K5
SW2	Overload Circuit Breaker 15A	Circuit Breaker	92-209	Spencer Thermostat CA15
SW3	Selector Switch	Selector Switch	45-202	AH&H 80238KD Special
* F1	1. 5 Amp 3AG Fuse 250V	Protective Fuse	42-407	Littlefuse 312015

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
* V1	6SL7GT Tube	Amplifier	12-034	RCA
* V2	2AS15A Tube	RMS Detector	12-010	Thermosen, Inc.
* V3	6L6GB Tube	Power Output	12-032	RCA
* V4	5Y3GT Tube	Rectifier Tube	12-023	RCA
* P1-P4	Neon Lamp	To regulate sensing bridge	42-301	General Electric NE 51
* P5	6.3 volt .15 amp Pilot Bulb	B Supply Pilot Bulb	42-303	General Electric #47
	Type ST-15, 1.5KVA, 480/240 and 240/120, 60 Cycle	Isolation Step Down Trans-former	91-911	Hindle 2275

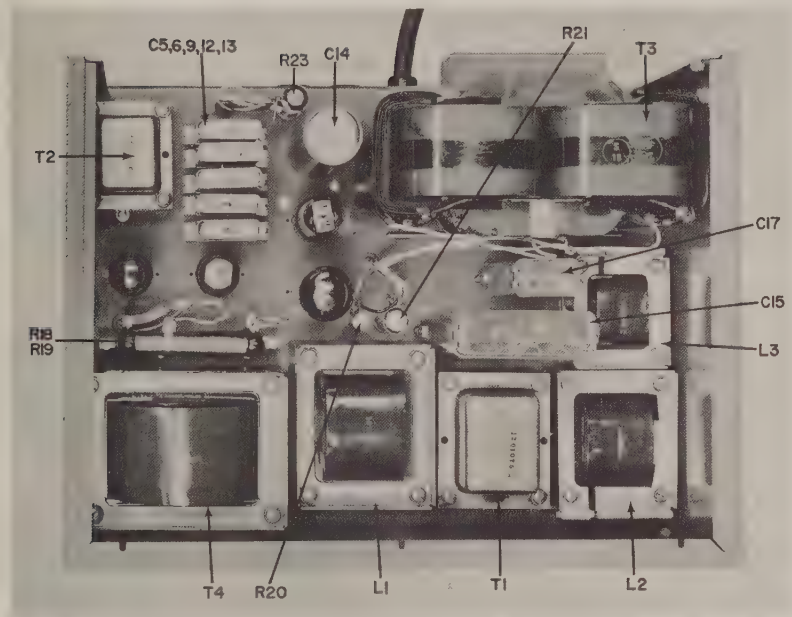


NOTE: LINKS SHOWN FOR
REG. OR STAB. POSITION
(SEE MANUAL)



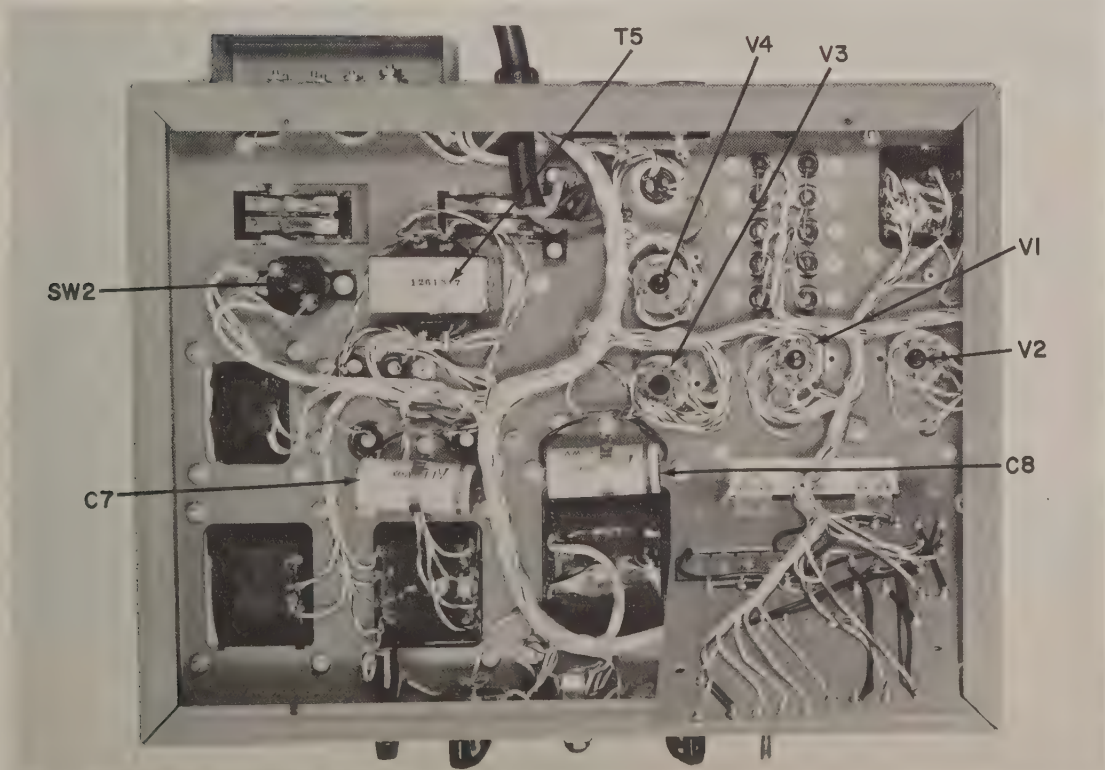
REV.	LET.		NEXT ASS'Y.	QUAN.	MAT'L.	SORENSEN & CO., INC. STAMFORD, CONN.
	NO.					
REVISION						SCHEMATIC MODEL 1001
					FINISH	
			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± 1/64 DECIMALS ± .005 ANGLE ± 1°			DRAWN G.H. 4-6-53 APPROV. 
			REMOVE ALL BURRS			
			DO NOT SCALE THIS DRAWING			
					SCALE 	SD 200-522

Top View



MODEL 1001

All Serial Numbers Before 1B-897



Bottom View

Replacement Parts List

Model 2501

Serial Number 2A-163 to _____

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
R1	100K ohm 1/2W Resistor	60 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R2	100K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R3	5100 ohm 1/2W Resistor	60 Cycle Filter Resistor	27-135	Allen Bradley EB5125
R4	10K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-137	Allen Bradley EB1035
R5	470K ohm 1/2W Resistor	Bridge Resistor	27-136	Allen Bradley EB4745
R6	470K ohm 1W Resistor	Bridge Resistor	27-245	Allen Bradley GB4741
R7	1 meg ohm 1W Resistor	Bridge Resistor	27-124	Allen Bradley EB1051
R8	68K ohm 1W Resistor	Anti-Surge	27-227	Allen Bradley GB6831
R9	3.3K ohm 1W Resistor	Filter Resistor	27-292	Allen Bradley GB3321
R10	4.7K ohm 1W Resistor	Filter Resistor	27-209	Allen Bradley GB4721
R11	47K ohm 1W Resistor	Anti-Surge	27-223	Allen Bradley GB4731
R12	470K ohm 1W Resistor	Dropping Resistor	27-245	Allen Bradley GB4741
R13	100K ohm 1/2W Resistor	Dropping Resistor	27-116	Allen Bradley EB1045
R14	47K ohm 1/2W Resistor	Anti-Hunt Resistor	27-111	Allen Bradley EB4735
R15	500K ohm 1W Resistor	Bridge Resistor	27-928	Mepco WM4L 1%
R16	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R17	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R18	180 ohm 50W Adj. Resistor	Dropping Resistor	28-642	Tru-ohm AR50
R19	180 ohm 50W Resistor	Dropping Resistor	28-643	Tru-ohm FR50
R20	25K ohm 10W Resistor	AC Shunt Resistor	28-620	Sprague 28E 10W
R21	35K ohm 20W tap at 10K ohms	Bleeder Resistor	90-071	Sorensen
R23	75 ohm 25W Adj. Resistor	Stabilized Output Adjust	28-630	Tru-ohm AR25
R24	50 ohm 7W Potentiometer	Output Adjust Potentiometer	29-223	Mallory per Sorensen Spc c.
R25	1.5K ohm 50W Adj.	Voltage Dropping Resistor	27-818	Ward Leonard 50A
C1	0.1 mfd. 200V Capacitor	60 Cycle Filter	24-101	Sprague 67P10492 10%
C2	0.27 mfd. 200V Capacitor	60 Cycle Filter	24-108	Sprague 67P27492 10%
C3	0.047 mfd. 200V Capacitor	120 Cycle Filter	24-100	Sprague 67P47392 10%
C4	0.057 mfd. 200V Capacitor	120 Cycle Filter	24-100	Sprague 67P47392 10%
C5	1.0 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-225	Sprague PBT-551

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
C6	2. 0 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-227	Sprague PBT-565
C7	0. 33 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-184	Aerovox Type 84M
C8	0. 33 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-184	Aerovox Type 84M
C10	0. 05 mfd. 600V Capacitor	Anti-Surge	24-139	Cornell Dubilier PJ6S5
C11	0. 1 mfd. 600V Capacitor	Anti-Surge	24-125	Sprague 73P10406 20%
C12	1. 0 mfd. 600V Capacitor	Anti-Surge	24-225	Sprague PBT-551
C13	0. 5 mfd. 600V Capacitor	Anti-Surge	24-203	Sprague CPBTS-54
C14	4. 0 mfd. 600V Capacitor	Anti-Surge	24-383	Aerovox 609M
C15	14. 0 mfd. 330V Capacitor	3rd Harmonic Filter	24-364	Aerovox per Sorensen Spec.
C17	1. 0 mfd. 440V Capacitor	5th Harmonic Filter	24-339	Cornell Dubilier KGT4010
C18	0. 05 mfd. 1600V Capacitor	Ripple Suppressor	24-180	Sigamnd Type 39
C19	2 mfd. 330VAC Capacitor	2nd Harmonic Filter	24-369	Cornell Dubilier Type KS30-20-1
* T1	Power Transformer	Power Transformer	126-1699	Sorensen
T2	Control Power Transformer	Control Power Transformer	126-1700	Sorensen
T4	Auto Transformer	Auto Transformer	126-1698	Sorensen
* V1	6SL7GT Tube	Amplifier	12-034	RCA
* V2	2AS15A Tube	RMS Detector	12-010	Thermosen, Inc.
* V3	6L6GB Tube	Power Output	12-032	RCA
* V4	5Y3GT Tube	Rectifier Tube	12-023	RCA
* VR5	OB2 Tube	To regulate Sensing Bridge	12-001	RCA
* VR6	OB2 Tube	B Supply	12-001	RCA
		To regulate Sensing Bridge		
		B Supply		
L1	Load Reactor	Load Reactor	127-1316	Sorensen
L2	Third Harmonic Choke	Third Harmonic Choke	127-1309	Sorensen
L3	Fifth Harmonic Choke	Fifth Harmonic Choke	127-1077	Sorensen
L4	Second Harmonic Choke	Second Harmonic Choke	127-1268	Sorensen
L5	Saturable Core Reactor	Saturable Core Reactor	127-1302	Sorensen
* F1, 2	1. 5 Amp 3AG Fuse	Protective Fuse	42-407	Littlefuse 312:015
	Type ST-45, 5. 0KVA, 480/240 and 240/120, 60 cycle	Isolation Step Down Trans.	91-972	Hindle 2227
	Fuse Holder		42-459	Littlefuse 342-003

Replacement Parts List

Model 2501

Starting with Serial Number 2A-123 to 2A-162

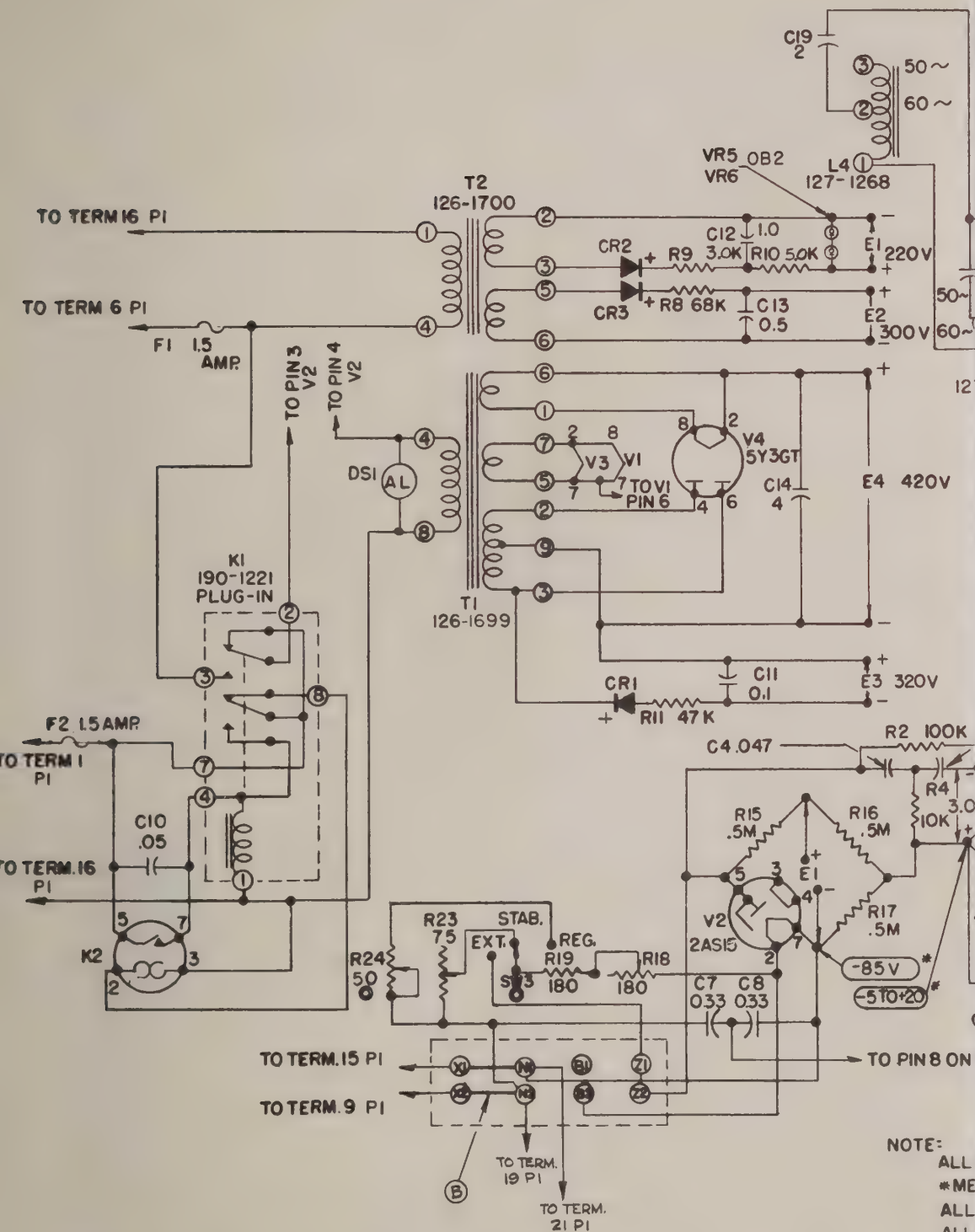
Listed below are all the components used in this instrument, together with their functions and part numbers.

Reference to the schematic diagram furnished with this manual will give the position of each component in the circuitry.

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
R1	100K ohm 1/2W Resistor	60 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R2	100K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R3	5100 ohm 1/2W Resistor	60 Cycle Filter Resistor	27-135	Allen Bradley EB5125
R4	10K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-137	Allen Bradley EB1035
R5	470K ohm 1/2W Resistor	Bridge Resistor	27-136	Allen Bradley EB4745
R6	470K ohm 1W Resistor	Bridge Resistor	27-245	Allen Bradley GB4741
R7	1 meg ohm 1W Resistor	Bridge Resistor	27-124	Allen Bradley EB1051
R8	68K ohm 1W Resistor	Anti-Surge	27-227	Allen Bradley GB6831
R9	3.3K ohm 1W Resistor	Filter Resistor	27-292	Allen Bradley GB3321
R10	4.7K ohm 1W Resistor	Filter Resistor	27-209	Allen Bradley GB4721
R11	47K ohm 1W Resistor	Anti-Surge	27-223	Allen Bradley GB4731
R12	470K ohm 1W Resistor	Dropping Resistor	27-245	Allen Bradley GB4741
R13	100K ohm 1/2W Resistor	Dropping Resistor	27-116	Allen Bradley EB1045
R14	47K ohm 1/2W Resistor	Anti-Hunt Resistor	27-111	Allen Bradley EB4735
R15	500K ohm 1W Resistor	Bridge Resistor	27-928	Mepco WM4L 1%
R16	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R17	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R18	180 ohm 50W Adj. Resistor	Dropping Resistor	27-868	Tru-ohm AR50
R19	180 ohm 50W Resistor	Dropping Resistor	27-868	Tru-ohm FR50
R20	25K ohm 10W Resistor	AC Shunt Resistor	27-560	Sprague 28E 10W
R21	35K ohm 20W tap at 10K ohms	Bleeder Resistor	90-071	Sorensen
R23	75 ohm 25W Adj. Resistor	Stabilized Output Adjust	27-735	Tru-ohm AR25
R24	50 ohm 7W Potentiometer	Output Adjust Potentiometer	29-223	Mallory per Sorensen Spe c.

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
R25	1. 5K ohm 50W Adj.	Voltage Dropping Resistor	- 27-818	Ward Leonard 50A
C1	0. 1 mfd. 200V Capacitor	60 Cycle Filter	24-101	Sprague 67P10492 10%
C2	0. 27 mfd. 200V Capacitor	60 Cycle Filter	24-108	Sprague 67P27492 10%
C3	0. 047 mfd. 200V Capacitor	120 Cycle Filter	24-100	Sprague 67P47392 10%
C4	0. 057 mfd. 200V Capacitor	120 Cycle Filter	24-100	Sprague 67P47392 10%
C5	1. 0 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-225	Sprague PBT-551
C6	2. 0 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-227	Sprague PBT-565
C7	0. 33 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-184	Aerovox Type 84M
C8	0. 33 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-184	Aerovox Type 84M
C10	0. 05 mfd. 600V Capacitor	Anti-Surge	24-139	Cornell Dubilier PJ6S5
C11	0. 1 mfd. 600V Capacitor	Anti-Surge	24-125	Sprague 73P10406 20%
C12	1. 0 mfd. 600V Capacitor	Anti-Surge	24-225	Sprague PBT-551
C13	0. 5 mfd. 600V Capacitor	Anti-Surge	24-203	Sprague CPBTS-54
C14	4. 0 mfd. 600V Capacitor	Anti-Surge	24-383	Aerovox 609M
C15	14. 0 mfd. 330V Capacitor	3rd Harmonic Filter	24-363	Aerovox per Sorensen Spec.
C17	1. 0 mfd. 440V Capacitor	5th Harmonic Filter	24-339	Cornell Dubilier KGT4010
C18	0. 05 mfd. 1600V Capacitor	Ripple Suppressor	24-180	Sigamd Type 39
C19	2 mfd. 330VAC Capacitor	2nd Harmonic Filter	24-369	Cornell Dubilier Type KS30-20-1
* T1	Power Transformer	Power Transformer	126-1699	Sorensen
T2	Control Power Transformer	Control Power Transformer	126-1700	Sorensen
T4	Auto Transformer	Auto Transformer	126-1698	Sorensen
V1	6SL7GT Tube	Amplifier	12-034	RCA
* V2	2AS15A Tube	RMS Detector	12-010	Thermosen, Inc.
* V3	6L6GB Tube	Power Output	12-032	RCA
* V4	5Y3GT Tube	Rectifier Tube	12-023	RCA
* VR5	OB2 Tube	To regulate Sensing Bridge	12-001	RCA
		B Supply		
* VR6	OB2 Tube	To regulate Sensing Bridge	12-001	RCA
		B Supply		

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
L1	Load Reactor	Load Reactor	127-1316	Sorensen
L2	Third Harmonic Choke	Third Harmonic Choke	127-1309	Sorensen
L3	Fifth Harmonic Choke	Fifth Harmonic Choke	127-1077	Sorensen
L4	Second Harmonic Choke	Second Harmonic Choke	127-1268	Sorensen
L5	Saturable Core Reactor	Saturable Core Reactor	127-1302	Sorensen
* F1, 2	1.5 Amp 3AG Fuse	Protective Fuse	42-407	Littlefuse 312:015
	Type ST-45, 5.0KVA, 480/240 and 240/120, 60 cycle	Isolation Step Down Trans.	91-972	Hindle 2227

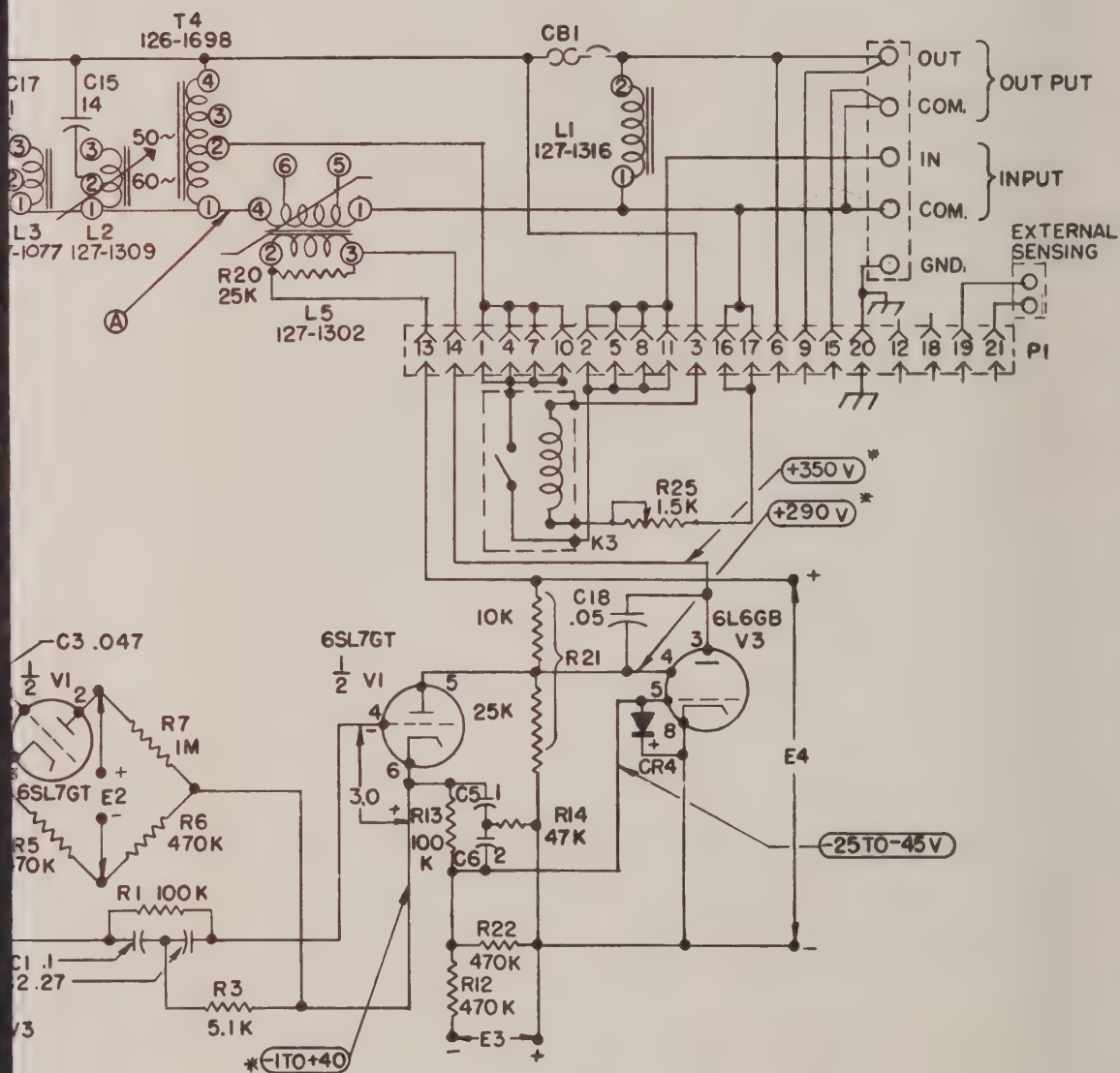


NOTE:

- (A) THESE LEADS MAY BE INTERCHANGED AT FINAL TEST
- (B) LINKS SHOWN FOR REG. OR STAB. POSITION (SEE MANUAL)

NOTE:

ALL V
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VOLTAGES MEASURED AT 1000 VA LOAD 115V INPUT LINE.
 ASURED TO PIN 8 OF V3 (DC).
 CAPACITANCE VALUES IN MFD UNLESS OTHERWISE NOTED.
 RESISTANCE VALUES IN OHMS UNLESS OTHERWISE NOTED
 00 OHMS M=1MEGOHM,
 NEL CONTROL.
 NSFORMER TAPS ARE SELECTED AT FINAL TEST AND MAY
 ER FROM THOSE INDICATED.

SORENSEN & CO., INC.
 STAMFORD, CONN.

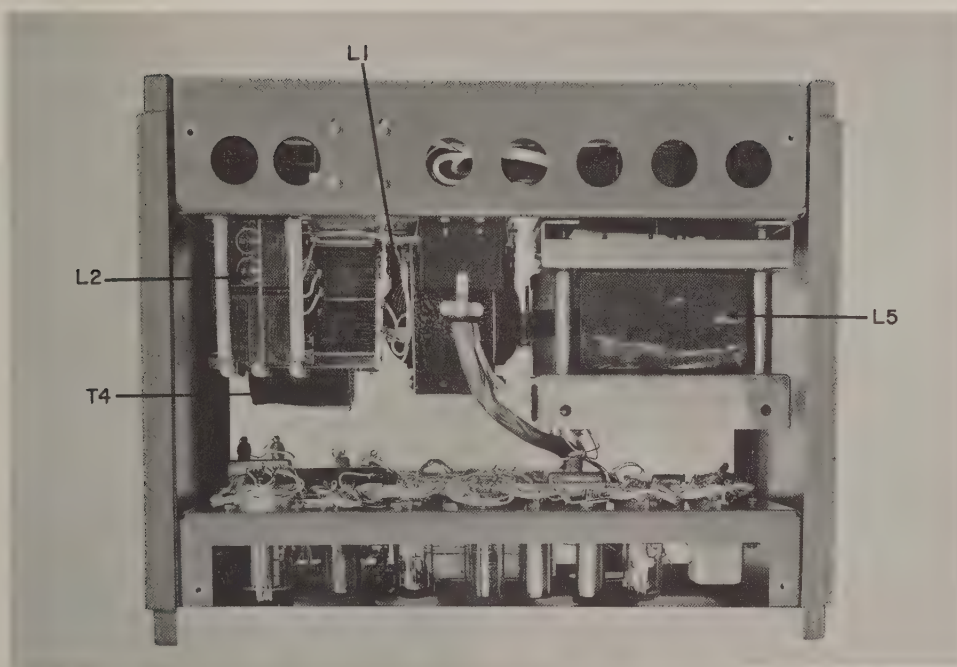
SCHEMATIC
 2501

DRAWN 10-7-57 GM APPROV. P6 12-2-57

SD200-1299

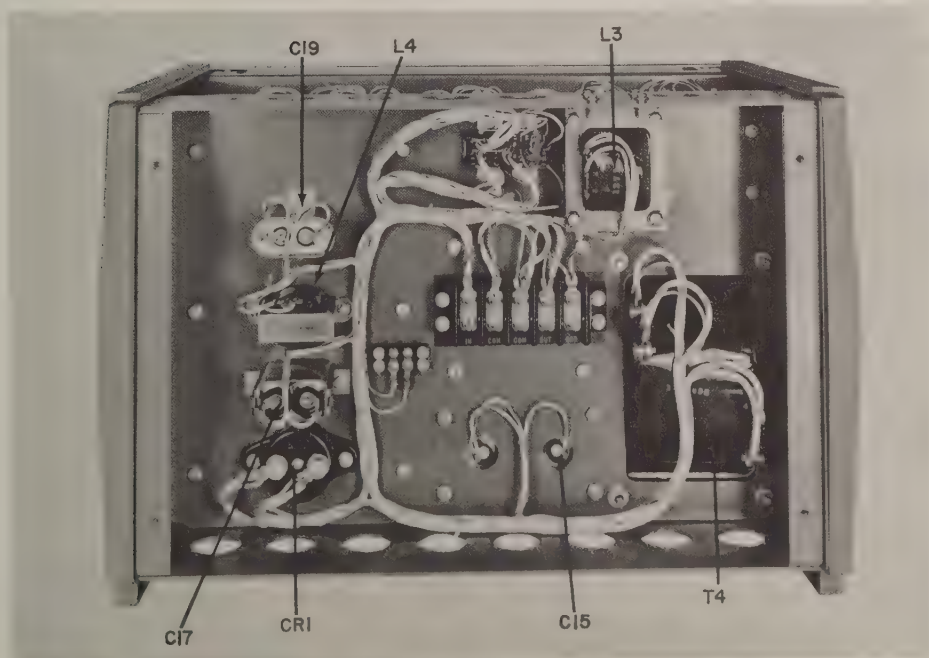
SERIAL NO. 2A-163 TO _____

Top View



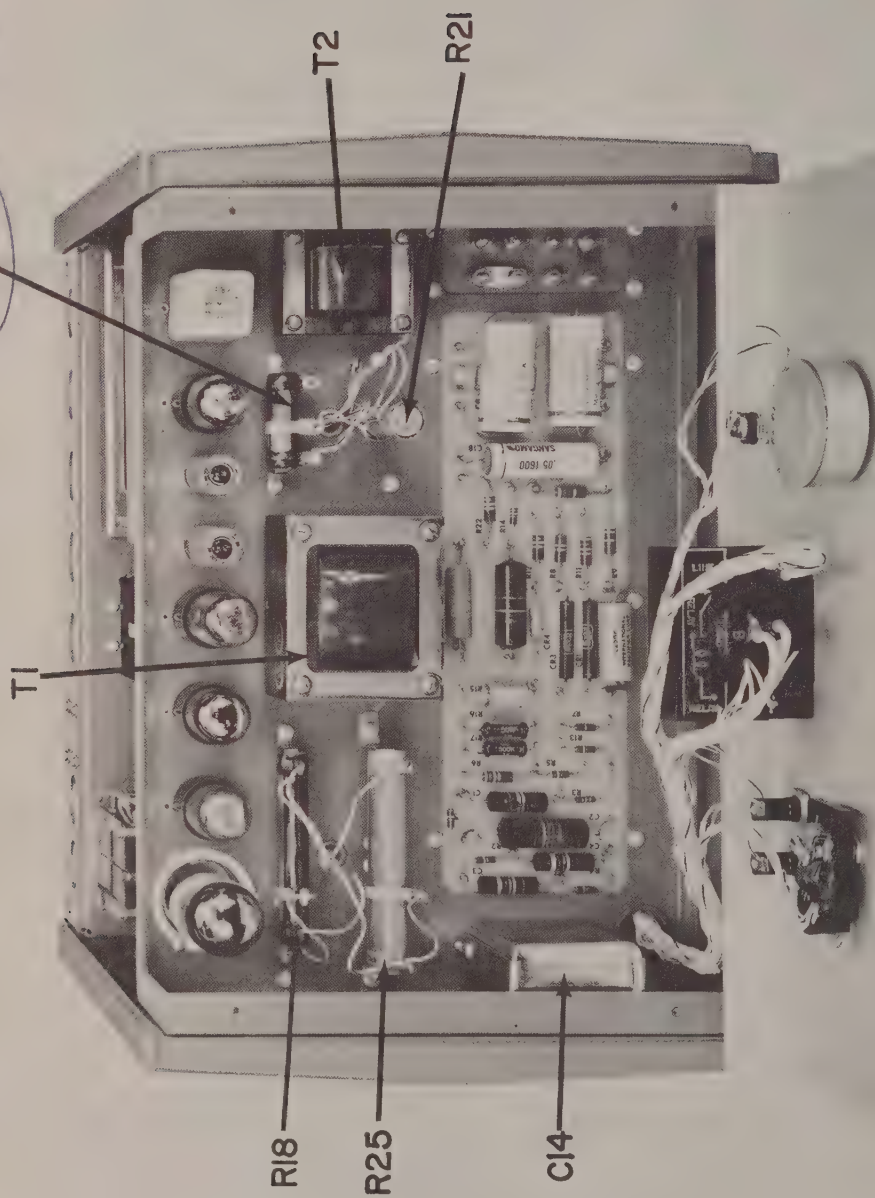
MODEL 2501

Starting with Serial Number 2A-123



Bottom View

1123 R23 R24



MODEL 2501
Starting with Serial Number 2A-123

OLD

Replacement Parts List

Model 2501

All Serial Numbers Before 2A-123

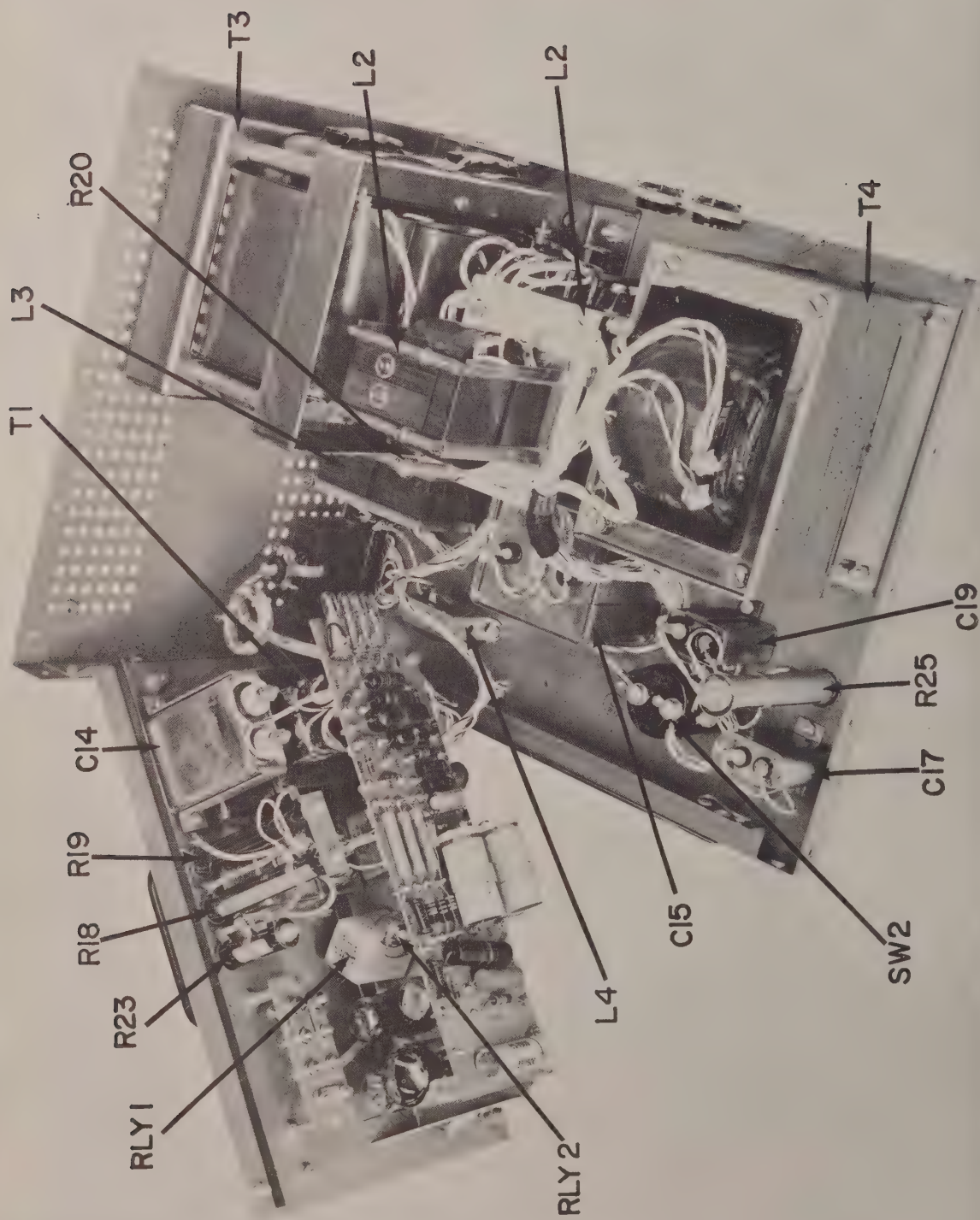
Listed below are all the components used in this instrument, together with their functions and part numbers.

Reference to the schematic diagram furnished with this manual will give the position of each component in the circuitry.

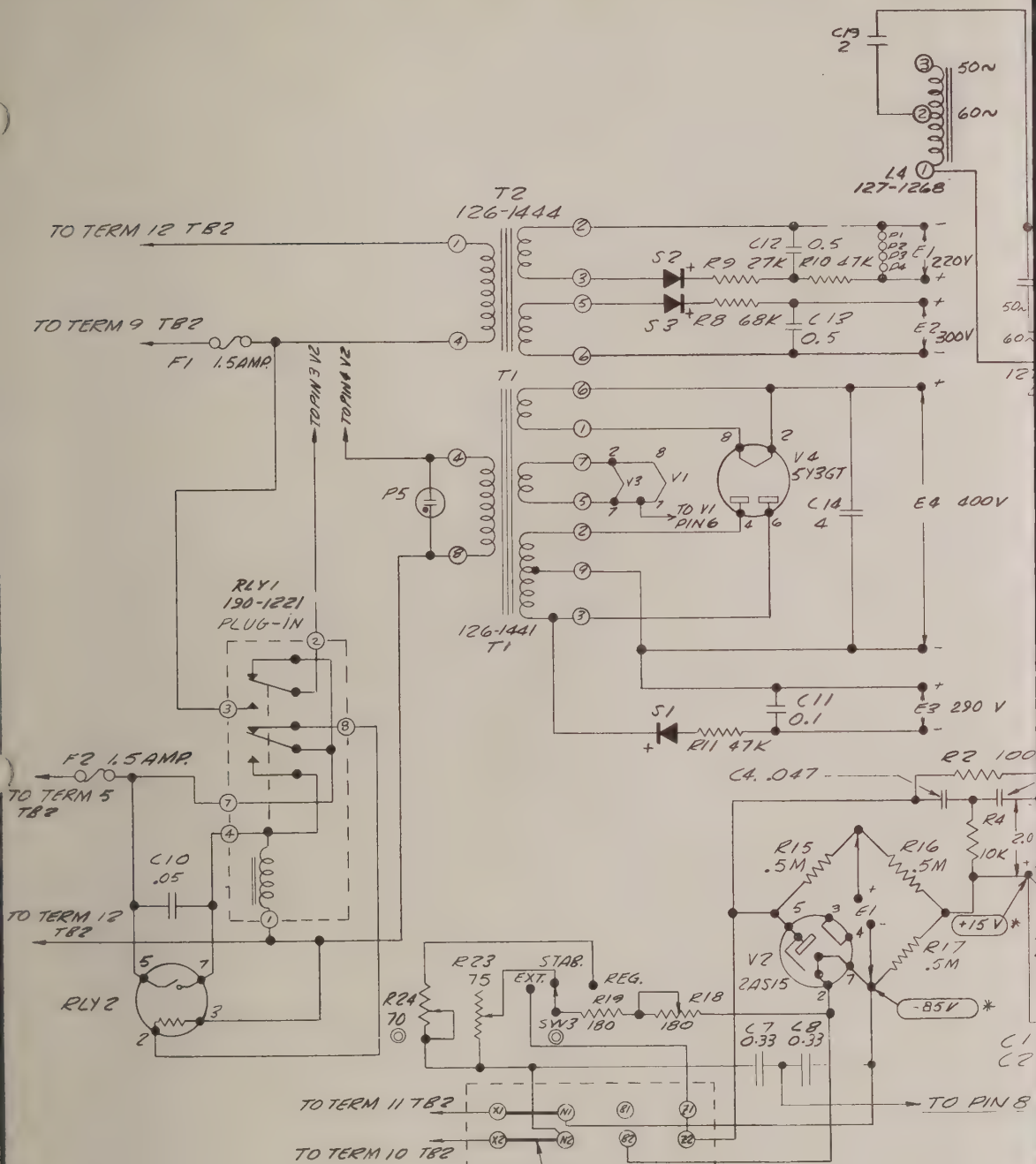
Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
R1	100K ohm 1/2W Resistor	60 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R2	100K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-116	Allen Bradley EB1045
R3	5100 ohm 1/2W Resistor	60 Cycle Filter Resistor	27-135	Allen Bradley EB5125
R4	10K ohm 1/2W Resistor	120 Cycle Filter Resistor	27-137	Allen Bradley EB1035
R5	470K ohm 1/2W Resistor	Bridge Resistor	27-136	Allen Bradley EB4745
R6	470K ohm 1W Resistor	Bridge Resistor	27-245	Allen Bradley GB4741
R7	1 meg ohm 1W Resistor	Bridge Resistor	27-124	Allen Bradley EB1051
R8	68K ohm 1W Resistor	Anti-Surge	27-227	Allen Bradley GB6831
R9	27K ohm 1W Resistor	Filter Resistor	27-966	Nobeloy Cont. Carbon PX-
R10	47K ohm 1W Resistor	Filter Resistor	27-967	Nobeloy Cont. Carbon PX-
R11	47K ohm 1W Resistor	Anti-Surge	27-223	Allen Bradley GB4731
R12	470K ohm 1W Resistor	Dropping Resistor	27-245	Allen Bradley GB4741
R13	100K ohm 1/2W Resistor	Dropping Resistor	27-116	Allen Bradley EB1045
R14	47K ohm 1/2W Resistor	Anti-Hunt Resistor	27-111	Allen Bradley EB4735
R15	500K ohm 1W Resistor	Bridge Resistor	27-928	Mepco WM4L 1%
R16	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R17	500K ohm 1W Resistor	Bridge Resistor	27-929	Cont. Carbon Nobeloy X-1
R18	180 ohm 50W Adj. Resistor	Dropping Resistor	27-868	Tru-ohm AR50
R19	180 ohm 50W Resistor	Dropping Resistor	27-869	Tru-ohm FR50
R20	25K ohm 10W Resistor	AC Shunt Resistor	27-529	Ward Leonard 10F
R21	35K ohm 20W tap at 10K ohms	Bleeder Resistor	90-071	Sorensen
R23	75 ohm 25W Adj. Resistor	Stabilized Output Adjust	27-735	Tru-ohm AR25
R24	70 ohm 10W Potentiometer	Output Adjust Potentiometer	29-026	Hardwick Hindle 2462-F
R25	1.5K ohm 50W Adj. Resistor	Voltage Dropping Resistor	27-818	Ward Leonard 50A

Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
C1	0.1 mfd. 200V Capacitor	60 Cycle Filter	24-101	Sprague 67P10492 10%
C2	0.27 mfd. 200V Capacitor	60 Cycle Filter	24-108	Sprague 67P27492 10%
C3	0.047 mfd. 200V Capacitor	120 Cycle Filter	24-100	Sprague 67P47392 10%
C4	0.047 mfd. 200V Capacitor	120 Cycle Filter	24-100	Sprague 67P47392 10%
C5	1.0 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-225	Sprague PBT-551
C6	2.0 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-227	Sprague PBT-565
C7	0.5 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-137	Cornell Dubilier PJ6P5
C8	0.5 mfd. 600V Capacitor	Anti-Hunt Capacitor	24-137	Cornell Dubilier PJ6P5
C10	0.05 mfd. 600V Capacitor	Anti-Surge	24-139	Cornell Dubilier PJ6S5
C11	0.1 mfd. 600V Capacitor	Anti-Surge	24-125	Sprague 73P10406 20%
C12	0.5 mfd. 600V Capacitor	Anti-Surge	24-203	Sprague CPBTS-54
C13	0.5 mfd. 600V Capacitor	Anti-Surge	24-203	Sprague CPBTS-54
C14	4.0 mfd. 600V Capacitor	Anti-Surge	24-383	Aerovox 609M
C15	14.0 mfd. 330V Capacitor	3rd Harmonic Filter	24-364	Aerovox per Sorensen Spec
C17	1.0 mfd. 440V Capacitor	5th Harmonic Filter	24-339	Cornell Dubilier KGT4010
C18	0.05 mfd. 1600V Capacitor	Ripple Suppressor	24-180	Sigamd Type 39
T1	Power Transformer	Power Transformer	126-1441	Sorensen
T2	Control Power Transformer	Control Power Transformer	126-1444	Sorensen
T3	Saturable Core Reactor	Saturable Core Reactor	127-1078	Sorensen
T4	Auto Transformer	Auto Transformer	126-1531	Sorensen
L1	Load Reactor	Load Reactor	127-1152	Sorensen
L2	Third Harmonic Choke	Third Harmonic Choke	127-1107	Sorensen
L3	Fifth Harmonic Choke	Fifth Harmonic Choke	127-1077	Sorensen
V1	6SL7GT Tube	Amplifier	12-034	RCA
V2	2AS15A Tube	RMS Detector	12-010	Thermosen, Inc.
V3	6L6GB Tube	Power Output	12-032	RCA
V4	5Y3GT Tube	Rectifier Tube	12-023	RCA
P1-P4	Neon Lamp	To regulate sensing bridge B Supply	42-301	General Electric NE 51
	Type ST-45, 5.0KVA, 480/240 and 240/120, 60 cycle	Isolation Step down Trans.	91-972	Hindle 2227

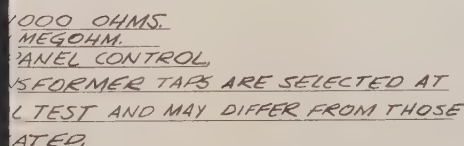
Schematic Symbol	Description	Function	Sorensen Part No.	Specifications
* F1, 2	1.5 Amp 3AG Fuse	Fuse	42-407	Littlefuse 312:015
SW1	Over Voltage Circuit Breaker	Over Voltage Circuit Breaker	92-251	Heinemann 40-608
SW2	Overload Circuit Breaker	Overload Circuit Breaker	92-237	Spencer Thermostat CLA35
SW3	Selector Switch	Selector Switch	45-202	AH&H 80238KD per Sorensen Spec.
S1 to S3	Selenium Rectifier	Selenium Rectifier	26-900	Bradley SE8L32H
S4	Selenium Rectifier	Selenium Rectifier	26-904	Bradley SE8LA10H342
RLY1	Transfer Relay	Transfer Relay	190-1221	Sorensen
* RLY2	Time Delay Relay	Time Delay Relay	92-111	Amperite 115N060



MODEL 2501
All Serial Numbers Before 2A-123



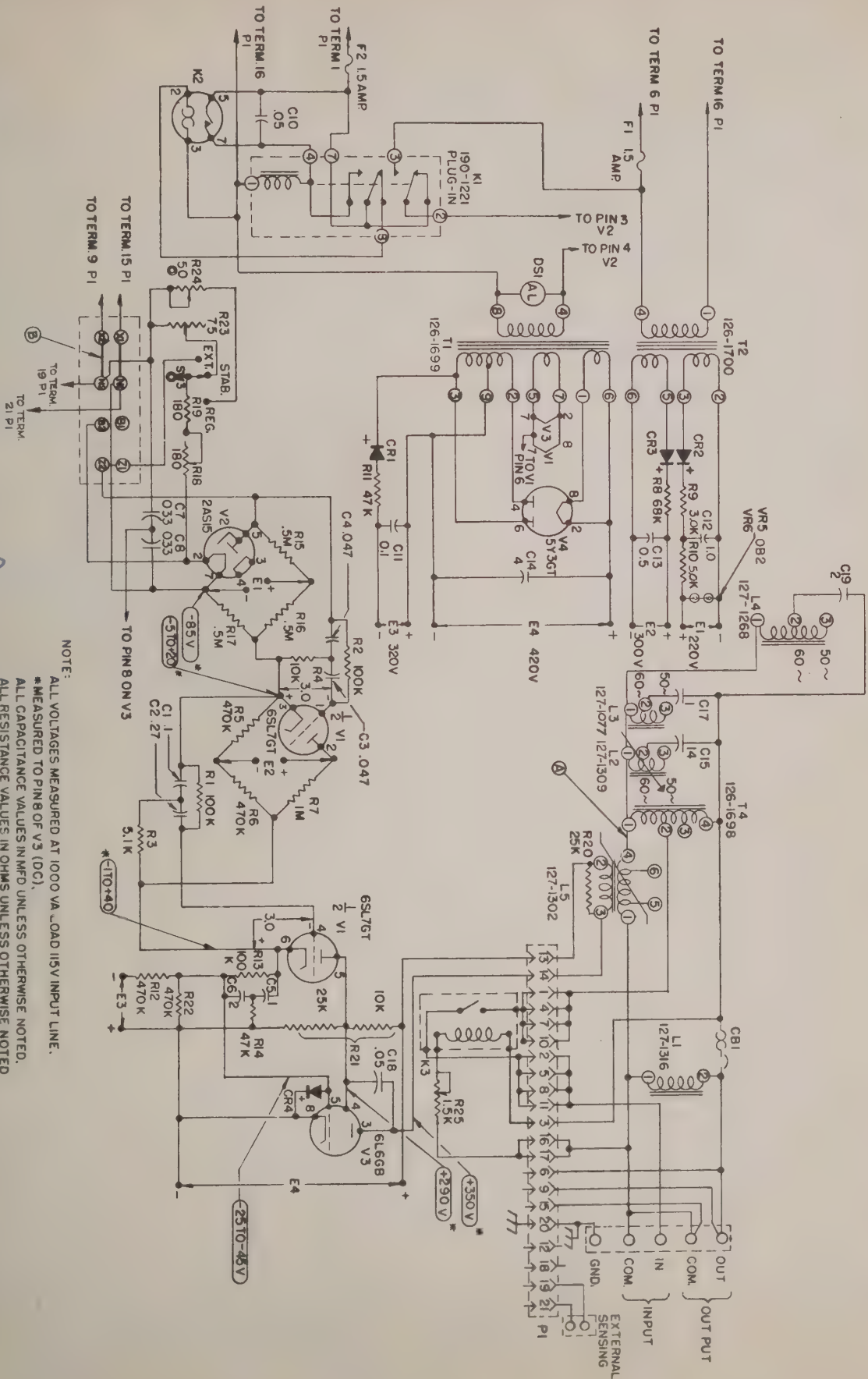
5. K =
 6. M =
 7. C =
 8. TRA =
 FINA =
 INDIC =



NOTE:

1. ALL VOLTAGES MEASURED AT 1000 VA LOAD
115V INPUT LINE.
- * 2. MEASURED TO PIN 8 OF V.P. (DC)
3. ALL CAPACITANCE VALUES IN MFD UNLESS
OTHERWISE NOTED.
4. ALL RESISTANCE VALUES IN OHMS UNLESS
- OTHERWISE NOTED.

REV. NO.	LET.		NEXT ASS'Y.	QUAN.	MAT'L.	SORENSEN & CO., INC. STAMFORD, CONN.
REVISION					FINISH	SCHEMATIC 2501
			UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON FRACTIONS ± 1/64 DECIMALS ± .005 ANGLE ± 1°			DRAWN <i>2-24-56</i> BY <i>TH</i> APPROV. <i>JS</i> <i>2-5-56</i>
			REMOVE ALL BURRS			
			DO NOT SCALE THIS DRAWING			
					SCALE <i>1X</i>	SD <i>200-1032</i>



NOTE.

- Ⓐ THESE LEADS MAY BE INTERCHANGED AT FINAL TEST
- Ⓛ LINKS SHOWN FOR REG. OR STAB POSITION (SEE MANUAL)

NOTE: ALL VOLTAGES MEASURED AT 1000 VA, LOAD 115V INPUT LINE.
* MEASURED TO PIN 8 OF V3 (DC).
ALL CAPACITANCE VALUES IN MFD UNLESS OTHERWISE NOTED.
ALL RESISTANCE VALUES IN OHMS UNLESS OTHERWISE NOTED
K=1000 OHMS M=1MEG OHM.
⊗ PANEL CONTROL.
TRANSFORMER TAPS ARE SELECTED AT FINAL TEST AND MAY
DIFFER FROM THOSE INDICATED

SORENSEN

SCHEMATIC

2501

DRAWING-757GM APPROV

NEW

REPLACEMENT PARTS LIST

Model 2501 AC Regulator

Serial No. 2A-163 to

Schematic Symbol	Description	Sorensen Part No.	Specifications
R1,2,13	100K ohm 1/2W Resistor	27-116	Allen Bradley EB 1045
R3	5100 ohm 1/2W Resistor	27-135	Allen Bradley EB 5125
R4	10K ohm 1/2W Resistor	27-137	Allen Bradley EB 1035
R5	470K ohm 1/2W Resistor	27-136	Allen Bradley EB 4745
R6,12,22	470K ohm 1W Resistor	27-245	Allen Bradley GB 4741
R7	1 meg ohm 1W Resistor	27-124	Allen Bradley EB 1051
R8	68K ohm 1W Resistor	27-227	Allen Bradley GB 6831
R9	3.0K ohm 5W Resistor	27-431	WARD LEONARD WL5X
R10	5.0K ohm 5W Resistor	27-430	WARD LEONARD WL5X
R11	47K ohm 1W Resistor	27-223	Allen Bradley GB 4731
R14	47K ohm 1/2W Resistor	27-111	Allen Bradley EB 4735
R15	500K ohm 1W Resistor	27-928	Mepco WM4L 1%
R16,17	500K ohm 1W Resistor	27-929	Cont. Carbon Nobeloy X-1
R18	180 ohm 50W Adj. Resistor	28-642	Tru-ohm AR50
R19	180 ohm 50W Resistor	28-643	Tru-ohm FR50
R20	25K ohm 10W Resistor	28-620	Sprague 28E 10W
R21	35K ohm 20W tap at 10K ohms	90-071	Sorensen & CO., Inc.
R23	75 ohm 25W Adj. Resistor	28-630	Tru-ohm AR25
R24*	50 ohm 7W Potentiometer	29-223	Mallory Per Sor. Spec.
R25	1.5K OHM 50 W ADJ	27-818	Ward Leonard 50 A
C1	0.1 mfd 200V Capacitor	24-101	Sprague 67P10492 10%
C2	0.27 mfd 200V Capacitor	24-108	Sprague 67P27492 10%
C3,4	0.047 mfd 200V Capacitor	24-100	Sprague 67P47392 10%
C5,12	1.0 mfd 600V Capacitor	24-225	Sprague PBTT-551
C6	2.0 mfd 600V Capacitor	24-227	Sprague PBTT-565
C7,8	0.33 mfd 600V Capacitor	24-184	Aerovox Type 84M
C10	0.05 mfd 600V Capacitor	24-139	Cornell Dubilier PJ6S5
C11	0.1 mfd 600V Capacitor	24-125	Sprague 73P10406 20%
C13	0.5 mfd 600V Capacitor	24-203	Sprague CPBTS-54
C14*	4.0 mfd 600V Capacitor	24-383	Aerovox 609M
C15	14.0 mfd 330V Capacitor	24-364	Aerovox per Sorensen Spec.
C17	1.0 mfd 440V Capacitor	24-339	Cornell Dubilier KGT4010
C18	0.05 mfd 1600V Capacitor	24-180	Sigamd Type 39

*

RECOMMENDED SPARE PARTS: This instrument normally requires the replacement only of tubes, pilot lamps, etc. However because of possible improper use, and because of the effects of high ambients and of certain kinds of tube failures (and of protective devices) we suggest that the parts marked with an asterisk be kept on hand. PLEASE REFERENCE THE MODEL AND SERIAL NUMBERS ON ALL PARTS ORDERS.

For Reference see
Schematic drawing

SD200-1299

dated See Serial No.

List No. SB14-2053

Page 1 of 2

Prepared by VM/jm

Date 10/31/57

REPLACEMENT PARTS LIST

Model 2501 AC Regulator

Serial No. 2A-143 to

Schematic Symbol	Description	Sorensen Part No.	Specifications
T1*	Power Transformer	126-1699	Sorensen & Co., Inc.
T2	Control Power Transformer	126-1700	Sorensen & Co., Inc.
L5	Saturable Core Reactor	127-1302	Sorensen & Co., Inc.
T4	Auto Transformer	126-1698	Sorensen & Co., Inc.
L1	Load Reactor	127-1316	Sorensen & Co., Inc.
L2	Third Harmonic Choke	127-1309	Sorensen & Co., Inc.
L3	Fifth Harmonic Choke	127-1077	Sorensen & Co., Inc.
V1 (*2ea.)	6SL7GT Tube	12-034	RCA
V2 (*2ea.)	2AS15-A Tube	12-010	Thermosen Inc.
V3 (*2ea.)	6L6GB Tube	12-032	RCA
V4 (*2ea.)	5Y3GT Tube	12-023	RCA
VR 5&6	OB2 Tube	12-001	RCA
F1,2 (*5ea.)	1.5 AMP 3 AG Fuse	42-407	Littel Fuse 312:015
	Fuse Holder	42-459	Littel Fuse 342:003
K3	Over Voltage Circuit Breaker	92-251	Heinemann 40-608
CB1	Overload Circuit Breaker	92-237	Spencer Thermostat CLA35
SW3	Selector Switch	45-018	A H & H. Per Sor. Spec.
CR1,3	Selenium Rectifier	26-900	Bradley SE8L32H
CR4	Selenium Rectifier	26-904	Bradley SE8LA10H342
CR2	Selenium Rectifier	26-987	IRC Z25HP per SB26-987
K1	Transfer Relay	190-1221	Sorensen & Co., Inc.
K2	Time Delay Relay	92-111	AMPERITE 115NO60
C19	2 mfd 330 VAC Capacitor	24-369	Cornell Dubilier Type KS3020-1
L4	Second Harm. Reactor	127-1268	Sorensen & Co., Inc.
DS1	NEON LAMP	42-301	GE NE51

For Reference see
Schematic drawing

SD200-1299

dated See Serial No.

*

RECOMMENDED SPARE PARTS: This instrument normally requires the replacement only of tubes, pilot lamps, etc. However because of possible improper use, and because of the effects of high ambients and of certain kinds of tube failures (and of protective devices) we suggest that the parts marked with an asterisk be kept on hand. PLEASE REFERENCE THE MODEL AND SERIAL NUMBERS ON ALL PARTS ORDERS.

List No. SB14-2053

Page 2 of 2

Prepared by VM/jm

Date 10-31-57

GENERAL INFORMATION

WARRANTY

SORENSEN/A Unit of Raytheon Company, warrants each instrument it manufactures to be free from defects in material and workmanship. The company's obligation under this warranty is limited to servicing the instrument and replacing defective parts*, when the instrument is returned to the factory with transportation charges prepaid. This warranty is effective for one year after delivery of the instrument to the original purchaser. Defects caused by improper operating conditions, misuse, negligence, or the alteration or removal of the nameplate, will void the warranty. SORENSEN shall in no circumstance be liable for any direct or consequential loss or damage of any nature resulting from the malfunction of the instrument. This warranty is effective in lieu of any or all other obligations or liabilities on the part of SORENSEN/A Unit of Raytheon Company, its agents, or representatives.

SERVICE INFORMATION

Questions concerned with the operation, repair, or servicing of this instrument should be directed to the nearest Sorensen representative (a list is included with this manual) or to the Service Department., Sorensen/A Unit of Raytheon Company, Richards Avenue, South Norwalk, Connecticut. *Include the model number and serial number, in any correspondence concerning this instrument.*

SHIPPING DAMAGE

It is possible for equipment to be damaged in shipment. Therefore, it is imperative that the instrument be tested and inspected as soon as it is received. If the instrument shows signs of damage, follow the instructions on the DAMAGE and/or Loss in Shipment form enclosed with the unit and notify the carrier immediately. The carrier's claim agent will then prepare a report of damage and, after you have forwarded this to the Sorensen Service Department, you will be advised as to the action necessary to have the instrument repaired or replaced.

RETURNS TO THE FACTORY

Should it be necessary to return an instrument to the factory for repair, please contact the Sorensen Service Department for authorization to make shipment.

DO NOT RETURN THE UNIT FOR REPAIR WITHOUT THIS AUTHORIZATION.

* The warranty excludes special purpose tubes, which carry their own manufacturer's warranties, and fuses.

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